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TO THE

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REPORT

OF THE

SECRETARY OF WAR;

BEING PART OF

THE MESSAGE AND DOCUMENTS

COMMUNICATED TO THE

TWO HOUSES OF CONGRESS

AT THE

BEGINNING OF THE SECOND SESSION OF THE FIFTIETH CONGRESS.

IN FOUR VOLUMES.

VOLUME III.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1888.

REPORT OF THE CHIEF OF ORDNANCE.

WAR DEPARTMENT, ORDNANCE OFFICE,
Washington, September 1, 1888.

SIR: I have the honor to submit the following report of the principal operations of the Ordnance Department during the fiscal year ended June 30, 1888, with such remarks and recommendations as the interests of this branch of the military service seem to require.

The fiscal resources and expenditures of the department during the year were as follows, viz:

Amount in the Treasury to the credit of the appropriations on June 30, 1887	$233,969.33
Amount in the Treasury not reported to the credit of the appropriations on June 30, 1887	4,761.50
Amount in Government depositories to the credit of disbursing officers and others on June 30, 1887	209,356.34
Amount of appropriations for the service of the fiscal year ended June 30, 1888	1,541,097.75
Amounts refunded to ordnance appropriations in settling accounts during the fiscal year ended June 30, 1888	278.03
Gross amount received during the fiscal year ended June 30, 1888, from sales to officers; from rents; from collections from troops on account of losses of, or damage to, ordnance stores; from Chicago, Rock Island and Pacific Railroad Company; from powder and projectiles (proceeds of sales); from sales of condemned stores; from testing machine, and from all other sources not before mentioned	50,706.55
Total	2,040,169.50

Amount of expenditures during the fiscal year ended June 30, 1888, including expenses attending sales of condemned stores, exchange of powder, etc	1,507,382.37
Amount deposited in Treasury during the fiscal year ended June 30, 1888, as proceeds of sales of Government property	21,141.38
Amount turned into the "surplus fund" on June 30, 1888	5,290.47
Amount in Government depositories to the credit of disbursing officers and others on June 30, 1888	157,850.89
Amount transferred from ordnance appropriations in settling accounts during the fiscal year ended June 30, 1888	5,709.34
Amount in the Treasury not reported to the credit of appropriations on June 30, 1888	1,020.48
Amount in the Treasury to the credit of appropriations on June 30, 1888	341,774.57
Total	2,040,169.50

STATIONS AND DUTIES.

The stations and duties of the officers of the Ordnance Department are as follows: Five at the Ordnance Office; thirty-five at the arsenals, armory, and powder depots; nine on the Ordnance Board and at the foundries; six at the several military headquarters and ordnance depots; two at the Military Academy; one under the orders of the Secretary of the Interior; one in the Life-Saving Service, under the Secretary of the Treasury.

The Ordnance Department provides the armament for our sea-coast defenses, and arms and other ordnance stores for the Army, the militia, the Marine Corps, all other Executive Departments to protect public money and property, and the colleges authorized by law to receive them for instruction.

SMALL-ARMS.

During the fiscal year ended June 30, 1888, 41,130 rifles and carbines have been manufactured at the National Armory. Repairing arms, providing spare parts, making swords, sabers, and miscellaneous articles must be mentioned among its operations.

During the past year the investigations have been completed relative to the determination of the charge and projectile, rifling, chamber, etc., for an arm of smaller caliber than the present service piece. It is the intention to use compressed and perforated cartridges, but as yet the powder makers have not succeeded in producing a satisfactory powder, the desired velocity being accompanied by too great a pressure. This matter of a suitable powder is still under study and trial. The results obtained in France with the Lebel rifle seem to point to a radical innovation in the manufacture of powder for small-arms.

COLUMBIA ARSENAL.

During the present session of Congress a law was passed (approved May 1, 1888) authorizing "the construction of an arsenal for the repair, storage, and distribution of ordnance and ordnance stores for the use of the Government of the United States, at Columbia, Tenn.," and appropriating $200,000 for its establishment. The law provides that without cost to the United States not less than 50 acres of suitable land is to be conveyed in fee to the United States, and that exclusive jurisdiction over said land by the United States Government is ceded by the State of Tennessee. A tract of land covering about 70 acres immediately outside the city limits has been thoroughly examined and accepted and the title to the same is now being investigated by the Department of Justice. As soon as these provisions of law have been complied with, steps will at once be taken to construct the arsenal.

PROCURING SUPPLIES.

All ordnance supplies are to be procured after due advertisement and competitive bidding, under section 3709, Revised Statutes. But

there are cases constantly occurring at our manufacturing establishments where small supplies are required, and under the present system of advertising for proposals experience has shown that such purchases entail loss upon the Government by reason of the higher prices asked when sealed proposals are required as well as the general disinclination of dealers and manufacturers to go through the formality of competitive bidding for small purchases, to say nothing of the additional loss by the consequent delay in this mode of purchase. I refer now to the minor supplies, the necessity for which can not be economically anticipated.

To meet such cases, and in the interest of a true public economy, I would recommend that section 3709, Revised Statutes, be amended by inserting after the word "services" on the first line the words "in excess of two hundred dollars," so that the section shall then read:

SEC. 3709. All purchases and contracts for supplies or services *in excess of two hundred dollars*, in any of the Departments of the Government, except for personal services, shall be made by advertising a sufficient time previously for proposals respecting the same, when the public exigencies do not require the immediate delivery of the articles or performance of the service. When immediate delivery or performance is required by the public exigency, the articles or service required may be procured by open purchase or contract, at the places and in the manner in which such articles are usually bought and sold, or such services engaged between individuals.

The Interior Department makes purchases in open market to the amount of $500, under existing law.

ARMAMENT OF FORTIFICATIONS.

No regular appropriation has been available for this purpose during the past fiscal year. The Department has been enabled, however, by means of the small permanent appropriation accruing from the proceeds of sales of unserviceable and obsolete material, to proceed with the manufacture of one 8-inch B. L. gun, composed entirely of American steel; of one 10-inch B. L. gun, of which the tube, jacket, and trunnion-hoop were obtained in England, and twenty-five 3.2-inch steel field guns. These guns are all under manufacture at the Watervliet Arsenal, West Troy, N. Y., and should be completed during the coming winter. The gun plant at this arsenal was established last year in pursuance of the recommendations of a board of ordnance officers convened by the Secretary of War for the purpose of selecting a suitable site for a gun factory, with a view to concentrating there the available gun machinery on hand in the Department. One of the large timber store-houses at this arsenal—a two-story brick building, 392 feet by 50 feet, and which cost $19,860—was deemed suitable for the purpose of a gun-shop. This building is located close to the site selected by the Gun Foundry Board. The timber was removed, a shrinking-pit excavated in the rock, and suitable foundations for the machines and floors and a railway track laid, all at an expense of about $20,000. The machines and tools taken from other arsenals, notably from the

Watertown Arsenal, and a large gun-lathe from the South Boston foundry, were set up in this building. The value of the machinery is estimated at about $50,000, though much of it is adapted only to the manufacture of smaller calibers, as field-guns, and most of it is more or less worn. The present capacity of the establishment is about 50 field-guns, and one 8-inch and one 10-inch gun per annum. Work was actively begun in this shop last November, the installation of the plant having been pushed to completion with unflagging energy and zeal by the commanding officer, Colonel Whittemore, and the ordnance officers on duty as his assistants. Estimates have been submitted to complete this plant so as to make type guns of 12-inch caliber, and to increase the present facilities for handling the work and for moving and shipping guns. In the event of Congress making an appropriation for a gun factory at this point, the present shop, with the smaller tools, would be devoted to the manufacture of field and siege guns.

TESTS OF ORDNANCE.

The firing of the 8-inch B. L. gun has been continued during the past year as rapidly as it was possible to procure suitable powders and as other important work would permit. Much delay has occurred from the failure of the powder makers to reproduce or duplicate powders which had been accepted as satisfactory. The gun has been fired 203 rounds, and is in a sound and serviceable condition. This firing has produced light but distinctly visible erosion marks on the front slope of the powder chamber, the shot chamber, and the bottom of the rifled bore. The firing will be continued until the endurance is thoroughly tested. Experience indicates that the erosion increases rapidly as the pressures increase, and the pressures during the test of this 8-inch gun have averaged over 16 tons, and reached as high as 22 tons per square inch of powder chamber. The gun is in the hands of the Board for Testing Rifled Cannon and Projectiles, and its report will be rendered during the coming year.

THE 12-INCH B. L. RIFLED MORTAR, CAST-IRON, HOOPED WITH STEEL.

This piece has been subjected to preliminary firings by the Ordnance Board, with the object of determining suitable kinds and weights of charge, in order to cover all ranges from 1 to 6 miles, without exceeding the prescribed limit of pressure and to ascertain the best form of banding for the projectiles. These firings are not yet completed, and the results thus far obtained can hardly be accepted as fully representative of the best that is to be expected from this piece. In all about 193 rounds have been fired, of which 78 rounds were with charges of from 50 to 80 pounds, with an average pressure of about 28,000 pounds, but reaching as high as 33,000 pounds per square inch. The maximum charge is not less than 80 pounds brown prismatic powder; density of loading, 1.113; weight of shell, 630 pounds; maximum velocity, 1,152 feet; energy,

5,796 foot-tons. The range attained with this charge and weight of shell under an angle of 45° was 10,480 yards, or 5.95 miles. It is the intention to subject the mortar to a fire of endurance of not less than 400 rounds, of which 200 shall be with the maximum charge, or in which the pressure shall be a maximum. It is also the intention to use a stronger powder for the maximum charge, so as to give a pressure of about 30,000 pounds, with the attainment of a velocity of about 1,175 feet. The present mounting of the mortar, as regards both carriage and platform, is so unsatisfactory that the firings for accuracy at long range will have to be postponed until at least a new platform can be laid. No firings for rapidity have as yet been made, and at this date it may be said that the accuracy of fire, endurance, and power are not definitely determined except as to the minimum limit.

5-INCH B. L. SIEGE RIFLE.

Preliminary firings have been made with this piece to determine the kind and charge of powder. The following ballistic results have been obtained:

Powder.		Density of loading.	Weight of projectile.	Muzzle velocity.	Pressure per square inch of powder chamber.	Muzzle energy.
Kind.	Weight.					
	Pounds.		*Pounds.*	*Feet.*	*Pounds.*	*Ft. tons.*
Du Pont's sphero hexagonal, density 1.728	10	0.721	43	1,628	25,000	791
	12	0.806	43	1,803	32,050	969
	12.5	0.901	43	1,829	34,961	997
Du Pont's black prismatic, density 1.800	14	1.009	45	1,860	35,000	1,079
	15	1.081	45	1,960	39,400	1,196

The black prismatic powder has not given very uniform results, as appears from comparing the firings made on different days. The weight of the 5-inch siege-gun is 3,660 pounds; length of bore, 27 calibers. The firings were made on the new steel overbank carriage, 47 rounds having been fired to June 30.

THE 7-INCH B. L. RIFLED HOWITZER, STEEL.

The only firings with this piece have also been preliminary for the purpose of working up a suitable powder. The results obtained are as follows:

Powder.		Density of loading.	Weight of shell.	Initial velocity.	Pressure per square inch of powder chamber.	Muzzle energy.
Kind.	Weight.					
	Pounds.		*Pounds.*	*Feet.*	*Pounds.*	*Ft. tons.*
L. X. B., density 1.706. Gr. 270	6	0.530	105	840	15,000	514
	7	0.618	105	922	19,275	619
	8	0.706	105	994	23,000	719
	8.5	0.750	105	1,038	25,300	784
	9	0.794	105	1,074	26,775	840
	9.25	0.817	105	1,093	28,400	870
I. K. K., density 1.725. Gr. 200	9	0.794	105	1,027	23,900	768
	9.5	0.839	105	1,070	26,800	833
	9.75	0.861	105	1,085	28,200	857

This piece weighs 3,750 pounds; length of bore, 12.4 calibers. No special carriage has as yet been provided.

12-INCH B. L. RIFLES, CAST-IRON, TUBED, AND CAST-IRON HOOPED AND TUBED.

The manufacture of these two guns, after being suspended for nearly two years, owing to the failure of the contractors to complete them within the life-time of the appropriation, was resumed this spring, Congress having reappropriated the money to pay for them, and having also extended the contracts. The 12-inch B. L. rifle, cast-iron, hooped, and tubed, has been completed and sent to the Proving Ground; the other gun, the 12-inch B. L. rifle, cast-iron, tubed, will probably be completed by next December.

I have the honor to submit the following papers, heretofore referred to:

Appendix 1.—Statement of principal articles procured by fabrication during the year ended June 30, 1888.

Appendix 2.—Statement of principal articles procured by purchase during the year ended June 30, 1888.

Appendix 3.—Statement of ordnance, ordnance stores, etc., issued to the military establishment, including the national homes for soldiers of the Volunteer and Regular Army, and exclusive of the militia, during the year ended June 30, 1888.

Appendix 4.—Statement of ordnance, ordnance stores, etc., distributed to the militia from July 1, 1887, to June 30, 1888, under section 1667, Revised Statutes.

Appendix 5.—Statement of ordnance, ordnance stores, etc., distributed to colleges from July 1, 1887, to June 30, 1888, under section 1225, Revised Statutes.

Appendix 6.—Statement of arms and ammunition issued to the Executive Departments during the year ended June 30, 1888, under the provisions of the act of March 3, 1879.

Appendix 7.—Report of action taken during the year ended June 30, 1888, under the provisions of the act approved March 3, 1881.

Appendix 8.—Showing the stations and duties of the officers of the Ordnance Department.

Appendix 9.—Annual Report of the Inspector of Ordnance at Midvale Steel Works.

Appendix 10.—Report on the Maxim gun—2 plates.

Appendix 11.—Ranges, etc., of 15-inch gun—2 plates.

Appendix 12.—Inspecting glass for small-arms—1 plate.

I have the honor to be, very respectfully, your obedient servant,

S. V. BENÉT,
Brigadier-General, Chief of Ordnance.

The SECRETARY OF WAR.

APPENDIX 1.

STATEMENT OF PRINCIPAL ARTICLES PROCURED BY FABRICATION AT THE ARSENALS DURING THE FISCAL YEAR ENDED JUNE 30, 1888.

CLASS I.

1 7-inch breech-loading steel siege howitzer.

CLASS II.

25 carriages for 3.2-inch guns.
1 carriage for 5-inch siege gun.

CLASS III.

13 breech-sights for 3.2-inch gun.
2 brakes, inelastic, for field carriages.
2 covers, breech and muzzle, for Hotchkiss mountain gun.
6 fuse blocks.
2 fuse wrenches.
2 gunners' haversacks.
3 gun-covers for Gatling gun.
25 gunners' reamers.
13 sets artillery harness for 2 wheel-horses.
26 sets artillery harness for 2 lead-horses.
46 harness sacks.
16 harness hooks, double.
100 lanyards.
34 muzzle or front sights for 3.2-inch gun.
4 quoins.
100 securing stakes.
12 scrapers for shells.
2 sponges and rammers for 10-pounder Parrott guns.
9 sponges and rammers for 24-pounder Coehorn mortar.
44 sponges and rammers for 3 inch rifled gun.
5 sponges and staves for 13-inch mortar.
110 thumb-stalls.
1 tompion for 3-inch rifle.
12 tompions for 15 inch guns.
2 tompions for 6-pounder gun.
7 vent covers.
27 vent pieces.
4 wiper stakes.
1 vent bushing, steel, for 3.2-inch gun.

4 pairs gunners' sleeves.
4 mauls.
12 pointing stakes.
53 feed guides for Gatling guns.
21 hoppers for Gatling guns.
111 feed cases for Gatling guns.
1 front sight, bronze, for 3.2-inch gun.
1 rear sight, bronze, for 3.2-inch gun.
100 paulins, 12 by 15 feet.
50 paulins, 11 by 11 feet.

CLASS IV.

154 5-inch shell for breech-loading steel rifle.
150 7-inch shell for breech-loading steel howitzer.

CLASS V.

25 6-pounder canister, filled.

CLASS VI.

5,000 Springfield carbines, caliber .45.
1 Springfield carbine, 24-inch barrel, caliber .45.
35,025 Springfield rifles, model 1884, caliber .45.
1,000 Springfield cadet rifles, caliber .45.
3 Springfield rifles, rod bayonet.
100 Springfield rifles, model 1884, caliber .45, with positive cams.
1 Springfield rifle, model 1884, caliber .45, not rifled or chambered.
3 swords, general officer's.

CLASS VII.

ARTILLERY ACCOUTERMENTS.

136 knapsacks for light batteries.

CAVALRY EQUIPMENTS.

4,953 cartridge belts fitted for cavalry.
3,000 carbine slings.
3,000 carbine-sling swivels.
2,000 pistol holsters.
2,000 saber belts.
3,000 saber-belt plates.
8 carbine slings, "Kelton's" device.
24 metal-bound packs, "Kelton's."
24 paper-bound packs, "Kelton's."
200 pistol-pack boxes, "Kelton's."
4,369 carbine slings, altered (G. O. 73).
20 pairs saber slings.

INFANTRY EQUIPMENTS.

10,105 bayonet-scabbard bodies.
6,322 bayonet scabbards.
5,000 blanket bags.

5,000	pairs blanket-bag shoulder-straps.
9,264	cartridge boxes, "McKeever," pattern 1874.
37	cartridge-belt plates.
10,000	canteens.
7,341	canteen straps.
6,386	pairs coat straps.
519	frogs, sliding.
5,601	gun-slings.
5,800	haversacks.
5,000	haversack straps.
17,500	tin cups.
10,434	waist belts.
10,233	waist-belt plates.
5,000	waist-belts and plates (without loops).
11,350	meat cans.
3,154	scabbards for hunting-knives, loops enlarged.

APPENDAGES.

38,208	headless-shell extractors.
8,669	screw-drivers.
31,950	wiping-rods, wooden.
16	pistol-grips, metallic.
235	pistol-grip screws.
500	cleaning-rods for shot-guns.

HORSE EQUIPMENTS FOR CAVALRY.

2,076	bridles, curb, cavalry.
3,265	bridles, watering.
3,000	halters and straps.
5,000	horse brushes.
1,055	horse covers.
2,000	nose-bags.
1	saddle-bag, leather.
107	side lines.
1,415	carbine boots and straps, altered to conform to G. O. No. 73.
1	crupper.
1,108	carbine boots and straps.
429	spur-straps.
179	saddle cloths, hair.
124	saddle cloths, line officers'.
16	saddle cloths, staff officers'.
7	saddle cloths, felt.
2	housings for brigadier-generals' saddle.

CLASS VIII.

5,796	blank cartridges, 3-inch gun.
47	blank cartridges, 3.2-inch gun.
2,630	blank cartridges, 6-pounder gun.
3,100	blank cartridges, 12-pounder gun.
5,386,547	rifle-ball cartridges, caliber .45, reloading.
183,660	rifle and carbine blank cartridges, caliber .45, reloading.
16,000	rifle-ball cartridges, caliber .45, reloading, solid head, 405 grain bullet.

1,000	carbine ball cartridges, caliber .45, reloading.
240,657	revolver blank cartridges, caliber .45, reloading.
300	paper fuses, ten seconds to the inch.
75	paper fuses, thirty seconds to the inch.
700	base fuse plugs for shells.
2,484,000	carbine bullets, caliber .45, 405 grains.
4,322,100	rifle bullets, caliber .45, 500 grains.
592,700	round balls, caliber .45.
58,985	friction primers for cannon.
700	electric primers for cannon.
200	obturator primers.

Class IX.

2	platforms for mortars.
2	sets marking outfits.
2	marksman's buttons.
50	sets reloading tools, bench.
2	chargers.
2	wrenches, powder charger.
2	extractors, primer (pins).
190	dies, reloading and crimping.
25	priming tools.
50	punches, reloading.
50	punches, resizing.
337	dies, resizing.
50	dies, crimping.
3	gauges, length.
50	spindles, reloading.
50	spindles, resizing.
1	wrench, die.
25	priming tool spindles.
2	primer inserting tools.
1	base resizing tool.
1	reloading tool, "Morse."
15	disks, with staves.
25,131,500	pasters, black and white.
119	signal flags.
72	streamers for rifle ranges.
55	targets, "Brinton."
203	targets, "Laidley" revolving.
55,523	targets, paper.
10	targets, truck, Texas.
1,295	target frames.
1	target, sectional, "Patten's."

Class X.

28	gas check cups, De Bange.
12	gas check pads, De Bange.
1	bottom cup of De Bange gas check
12	sets gas checks, De Bange.
2	screw studs for 3.2-inch rifle.
3	staves for marking disks.
2	spring obturators, De Bange, 15-inch rifle.
50	parts of field carriages.

48	poles for field or siege carriages.
25	caisson rails.
4	axle bodies.
18	foot-boards.
34	parts of field limbers.
24	bolts and nuts.
20	linchpins.
2	retraction ropes.
6	tuyere irons.
50	portable forge boxes, "Empire."
1	pair brakes for 5-inch siege carriage.
29	collars.
77	saddles.
24	brass staples for saddles.
16	saddle seats.
200	stirrup bars.
5	rammer heads, 3-inch guns.
15	sponge heads, 3-inch rifle guns.
18	sponges, 3-inch rifled guns.
100	sabots, 15-inch.
1,525	shanks for projectiles for Life-Saving Service.
1,595	stocks (wood part).
269	tips.
295	tip screws.
289	ramrod stops.
182	band springs.
191	side-screw washers.
211	butt plates.
469	butt-plate screws.
6	cover springs.
6	cover-spring screws.
6	cover friction springs.
136	stocks, complete.
106	guard plates.
110	guard bows.
537	guard-bow swivels.
437	guard-bow swivel screws.
43	guard-bow nuts.
476	triggers.
60	trigger screws.
790	guard screws.
23	rear-sight leaves.
11	rear sight leaf slides.
1,279	rear-sight screws, front and rear.
31	rear-sight joint pins.
2,457	rear-sights, complete.
12	barrels.
1	receiver.
5,241	extractors.
547	hinge pins.
3,895	ejector springs.
6,072	ejector-spring spindles.
126	ejector studs.
75	cam latches.
12	breech-block caps.
10	thumb pieces.

52	breech blocks
2,063	breech-block cap screws.
10,491	firing pins.
2,929	firing-pin screws.
1,767	cam-latch springs.
4	breech screws.
897	front-sight cover screws.
1,804	front sights.
2,403	front-sight covers.
100	hinge-pin studs.
2,283	front-sight pins.
749	tang screws.
7	carbine bands.
195	bands, upper.
37	band swivels.
1,792	bands, lower.
162	lock plates.
1,315	mainsprings.
1,241	mainspring swivels.
605	mainspring swivel rivets.
478	hammers.
1,469	tumblers.
3,965	tumbler screws.
1,135	bridles.
2,817	bridle screws.
1,778	sears.
2,386	sear screws.
1,656	sear springs.
748	sear-spring screws.
838	side screws.
364	ramrods.
5,000	ramrods, jointed.
304	bayonet clasps.
66	bayonet-clasp screws.
100	bayonet-clasp stop screws.
374	bayonets, complete.
312	swivel rings.
412	swivels, complete.
204	locks, complete.
1	windage-screw head.
1	windage-screw-head pin.
1	stock, wood part, Springfield shotgun.
6	stocks, Colt's revolver.
290	ejector heads, Colt's revolver.
1	receiver, Springfield shotgun.
1	barrels, Springfield shotgun.
4	plunger springs, Parker shotgun.
254	extractors, Springfield shotgun.
58	tumblers, swiveled.
80	stocks, assembled.
100	stocks, Hotchkiss navy rifle.
8	check-rein attachments, "Kelton's."
68	slides and hooks for saber belts.
1,467	saber straps.
3	sections of picket ropes, 1¼ inch.
959	cincha straps.

50	curb straps.
70	girth straps.
30	girth billets.
5,000	halter straps.
355	coat straps for saddles.
610	rings, brass, 1¼ inch.
543	rings, brass, 2¼ inch.
3	base plates, 12-inch (for armor plate).
184	silver bars for sharpshooter's badges.
1	pendant for sharpshooter's badge.
56	parts of reloading tools.
1	shell scraper.
2	shell scrapers, "Morse."
200	safety straps.
4,480	staples for rings.
3,100	stirrups with hoods, G. O. 73.
1	pair stirrups without hood.
143	cartridge bags, empty, 3-inch gun.
2,700	cartridge bags, empty, 3.2 inch gun.
150	cartridge bags, empty, 4.5-inch siege gun.
280	cartridge bags, empty, 8 inch converted gun.
500	cartridge bags, empty, 10-inch Rodman gun.
200	cartridge bags, empty, 15-inch Rodman gun.
25	cartridge bags, empty, 12-inch mortar.
75	cartridge bags, empty, 8-inch steel rifle.
72	cartridge bags, empty, 5-inch siege rifle.
70	cartridge bags, empty, 7-inch howitzer.
3,854,000	cartridge primers.
10,100	cartridge shells, rifle.
45,000	cartridge shells, revolver.
475	cartridge shells, Morse.
62	parts of "Brinton" targets.
1,418	parts of "Laidley" revolving target.
81	parts of "Cushing" targets.
19	parts of "Texas" targets.
10,650	cloth silhouettes.
21,410	paper silhouettes.
266,250	strings for skirmish targets.
3	channel beams, 12-inch (armor plate).

TOOLS AND MISCELLANEOUS.

258	arm chests.
2,611	packing boxes.
100	boxes for small-arm ammunition.
249	tin cans.
1	case.
100	boxes cleaning material.
50	packing boxes, "Williston's."
1	wardrobe.
10	boxes, reloading tools.
1	packing crate.
74	smiths' aprons.
559	brushes.
62	bits, assorted.
22	quarts blacking for leather.

356	chisels, various.
638	dies, various.
1,179	drills.
3	dies, complete for gas-check pads.
1,445	files, assorted.
262	files, rotary.
54	gauges.
500	gas-checks.
10	gauges, crusher pressure.
12	gauges, ring for setting star gauges.
12	sets star gauge points.
4	measuring-rods, adjustable.
1	gauge, verifying.
34	hammers.
2	handles.
250	boxes ingredients for leather blacking.
4	knife-blades.
16	mallets.
1	milling machine.
1	cartridge-priming and spreading machine.
1,466	mills, armorers'.
126	mandrels.
1,398	pounds harness oil.
1	power press.
5	punches, assorted.
25	pounds black paint.
180	pounds olive paint.
120	pounds green paint.
2	watering-pots.
1	plate, cleaning, sheet-iron.
5	plugs, screw.
32	pincers.
100	pressure-gauge cylinders.
50	pounds polishing materials.
144	ounces polish for leather.
100	portable arm-racks.
356	reamers.
123	arm-racks, altered.
3	stamps, seal.
20	sets stencil plates.
29	boxes stencil paste.
600	brass springs, with copper tongues.
600	upper cores, with hollow pins.
88	ounces scouring material.
1	sluice-gate, cast iron.
1	table.
241	taps, various.
877	tools for current service.
1	pin-driver.
1,000	truncated paper bands.
600	truncated paper cores.
1	wrench.
1	wire-scratch brush.
21	castings, various.
32	creasers and taps.

300 hawser cutters.
300 hawser cutter knives.
25 pounds hektograph composition.
10 blocks, punching, lead.
96 bottles indelible ink.
1 water boiler, cast iron.
12 posts, iron for military reservation.
4 button brushes.
4 button sticks.
4 pans, ash.
1 hektograph.

APPENDIX 2.

STATEMENT OF PRINCIPAL ARTICLES PROCURED BY PURCHASE DURING THE YEAR ENDED JUNE 30, 1888.

CLASS I.

1	12-inch breech-loading rifle.
1	12-inch breech-loading rifled mortar.
4	3.2-inch steel field guns.

CLASS II.

50	portable forges.

CLASS IV.

3,000	8-inch "Eureka" chilled cored shot.
4	7-inch "Stevens" dynamite shells.
50	3.2-inch "Sawyer" canister.
50	steel case shot.

CLASS VI.

10	Spencer repeating shot-guns.

CLASS VII.

2,000	artillery saddle blankets.
2,000	cavalry saddle blankets.
13,994	woven cartridge belts, caliber .45.
6	currycombs.
10,000	knives.
10,000	forks.
10,000	spoons.
24	tin cups.

CLASS VIII.

137,020	pounds small-arms powder.
20,882¼	pounds brown prismatic powder.
128,400	pounds hexagonal powder.
300	pounds square powder.
100	pounds giant powder.
700,000	rifle-ball cartridges, caliber .50.
200	giant-powder caps.

250,000	wads.
16,000	cartridge primers.
1,000	cannon primers.
500	feet safety-fuse.

CLASS IX.

2	double blocks.
2	single blocks.
2	differential pulley blocks.
8	tackle-blocks.
4	pulley blocks.

CLASS X.

8,259	parts of Colt's revolver.
76	parts of shotguns.
17	parts of Gatling guns.
26,767	gun-stocks.
183	"Archibald" wheels for artillery carriages.
106⅝	pounds escutcheon pins.
15,132	bar buckles.
11,500	iron rings.
7,124	halter squares.
4,320	halter bolts.
3,024	spring snaps.
200	copper bands for 8-inch shot.
2,468	staves for stirrups.
1,872	brass grommets.
6	horse collars.
621	parts of saddles.
25	wrought-iron axles for gun-carriages.
2	parts of 12-inch rifle.
32	parts of mortar carriage.

PART SECOND.

CLOTH, ROPE, THREAD, ETC.

96⅓	yards carpeting.
208⅓	yards cloth, woolen.
12	yards cloth, asbestos.
32	yards cloth, oiled and enameled.
80,465	yards cotton cloth.
957	yards felt.
7,795½	pounds cotton waste.
928¾	pounds cord and twine.
410	yards cord.
151¾	yards canton flannel.
350	yards flannel.
10	pounds flock.
785	pounds hair.
40	yards linoleum.
19	mats.
193	pounds oakum.
4,208½	pounds rope.

1,277⅜	pounds thread.
72	spools thread.
18	towels.
6	yards toweling.
51,220	yards webbing.
79	window shades.
1,150	yards tape.

FORAGE.

14,882	pounds barley.
13,295	pounds bran.
775	bushels corn.
18	barrels flour.
17½	bushels grass seed.
2,610	pounds grass-seed and lawn dressing.
13 138/2000	tons hay.
5,500	pounds ground feed.
22,150	pounds meal.
7,366	bushels meal.
7,036	bushels oats.
21	barrels salt.
3,022	pounds salt.
45 1285/2000	tons straw.

IRONMONGERY.

53½	pounds babbitt metal.
7	bath tubs and fixtures.
127,345	pounds I and channel beams.
2	boilers.
7,507	bolts.
79	pounds bolts.
100	pounds brads.
50	feet brass rods.
683¾	pounds brass rod.
2,603	pounds brass, sheet.
72	pounds burs.
41.496	buttons.
354	pounds bronze and brass castings.
210,550	pounds iron castings.
749	pounds steel castings.
1,890	feet chain.
360	cocks, assorted.
98¾	pounds bar copper.
229,167⅞	pounds cartridge copper.
1,476½	pounds sheet copper.
3	sets coupling.
43	door catches and fixtures.
337,125	eyelets.
60	gas-burners.
35	gas-fixtures.
5,286	pounds grate bar.
60	papers glazier's points.
806	pairs hinges.
1,272	hooks, assorted.
8,552	horseshoes.

880	pounds horseshoe nails.
2	hose fittings.
3,179	pounds hoop-iron.
$102\frac{1228}{2000}$	tons pig-iron.
14,410	pounds sheet-iron.
80,116½	pounds wrought-iron.
550	feet lightning-rod.
6	lightning-rod points.
156	knobs, assorted.
312	keys and blanks.
505,524	pounds lead.
720	locks, assorted.
3	pounds mica.
46,838¼	pounds nails.
8,640	saddler's nails.
1,704¼	pounds nuts.
1,864	nuts.
808½	pounds lead pipe.
7,505⅞	feet iron pipe.
20	feet brass pipe.
318¼	pounds pipe fittings.
3,187	pipe fittings, assorted.
985	pulleys.
8	pumps.
4	radiators.
28,401½	pounds rivets, assorted.
76,678	rivets, assorted.
593	pounds rivets and burs.
1,100	feet metallic rod.
2,381	gross screws.
246	gross screw-pins and eyes.
5	pounds staples.
11	staples.
4	sinks.
9,580	pounds sash-weights.
175	pounds solder.
11,767	pounds spikes.
154	springs, assorted.
953,886	pounds bar and plate steel.
14,633	pounds steel forgings.
14,743	pounds sheet steel.
1,802,000	tacks, assorted.
280¾	pounds tacks, assorted.
47,846	pounds block-tin.
750	pounds tin-foil.
107	boxes sheet-tin.
1,314¼	feet sheet-tin.
95⅞	pounds tubing.
121⅞	pounds washers.
14	water closets and fixtures.
1	urinal and fixtures.
1,194½	pounds brass wire.
355¼	pounds copper wire.
111	pounds copper-covered wire.
4,382½	pounds copper cartridge wire.
20	pounds insulated copper wire.

12,477¼ pounds iron wire.
7,950 pounds steel wire.
147½ pounds steel music wire.
800 feet copper wire.
500 feet copper-covered wire.
7 feet gun-screw wire.
3,339 pounds zinc.
68 feet zinc.
3,607 square feet wire-cloth.
169 square yards wire-cloth.
48 feet wire grating and netting.
444 window fixtures.
42 sets window fixtures.
68,391 pounds steel rails.

LEATHER.

335 pounds black wax.
12,912 feet leather belting.
1,323½ pounds bridle leather.
36 pounds bull-neck leather.
29 pounds belt leather.
223 pounds buff leather.
56,158¼ pounds harness leather.
310 pounds lag leather.
393¼ pounds lace leather.
39½ pounds polishing leather.
1,535 pounds strap leather.
54 pounds walrus leather.
74 pounds sole leather.
18½ square feet belt leather.
637¼ square feet calf-skin leather.
61,331½ square feet collar leather.
52 square feet enameled leather.
50 square feet lace leather.
586 sides bridle leather.
1,665 sides collar leather.
1 side calf-skin leather.
12 sides lace leather.
25 sides rawhide.
1,500 feet belt lacings.
1,178⅛ pounds bristles.
2 skins morocco.
60 sheepskins.
5 buckskins.
18 drop belts, leather.

LUMBER.

399,719⅞ feet boards.
30,300 laths.
482,047⅛ feet plank.
318 posts and rails.
85,417 feet scantling.
63,115 shingles.
7,100 feet strips.
115,679¼ feet timber.

BUILDING MATERIAL.

75¼	pounds asbestos.
130	square feet asbestos.
653,713	bricks.
2,062	barrels cement.
156	feet cement pipe.
82	barrels clay.
4	cubic yards clay.
21	doors, wood.
2,170	feet drain-pipe.
25	drain pipes.
6,122¼	cubic feet flagging.
268⅖	square feet flagging.
7,773½	feet window-glass.
459	lights window-glass.
1	load gravel.
4⅙	cubic yards gravel.
80½	bushels plastering-hair.
85	pounds plastering-hair.
1,535	barrels lime.
1,012⅓	bushels lime.
21	barrels plaster of paris.
1,331$\frac{56}{100}$	cubic yards sand.
1,448½	bushels sand.
1,100$\frac{692}{1000}$	cubic yards stone.
7	mantels.
17,852	slates.
20	barrels stucco.
34,121	pounds roofing iron.
4,320	feet tarred paper.
3,576	feet moldings.
53	rolls wall-paper.
3	rolls bordering-paper.
496	feet terra-cotta pipe.
7	terra-cotta traps, etc.
518	tiles.
48	pairs window blinds.
100	pairs window sash.
1	transom.
112	feet water spouts.
48	water-spout elbows and hooks.
1,191	feet weather strips.

HEATING, LIGHTING, ETC.

94	gallons anti-corrosive fluid for boilers.
511	brooms.
158	brushes, dusting, etc.
52	pounds candles.
6	chandeliers.
151$\frac{11}{36}$	square feet card-clothing.
28,672½	bushels charcoal.
148	barrels charcoal.
351	chamois-skins.
2,302$\frac{102}{2240}$	tons anthracite coal.

2,815$\frac{1566}{2240}$	tons bituminous coal.
72,900	pounds coke.
939	bushels coke.
554	pounds corundum.
359	corundum and emery wheels.
67	reams crocus and emery cloth.
25	cărats diamond powder.
2,573	pounds emery.
14,750	fire-brick.
16	sets fire-brick.
46	cords fire-wood.
60	grates and fixtures.
1	heating furnace and car.
6,720	pounds fluorspar.
8	lanterns.
22	lamps.
540	lamp fixtures.
51½	pounds lamp wick.
12	lamp wicks.
43½	gross matches.
27	mops and handles.
740	pounds polishing compound.
135	pounds pumice stone.
19	registers.
333	pounds rotten-stone.
125	pounds rosin.
51	reams sand-paper.
92	cakes sapolio.
3,658⅞	pounds soap.
799	gallons soft soap.
4$\frac{720}{2000}$	tons molding sand.
216⅜	pounds sponge.
9	stoves.
11	stove fixtures.
25	pounds stove-polish.
30	papers stove-polish.
22	stove-pipe elbows.
129	feet stove-pipe.
155	pounds stove-pipe.
132	feet steam-pipe covering.
66	barrels sea-coal facings.
412	papers tripoli.
50	pounds tripoli.
25	pounds quartz.
9	wash-stands and fixtures.
3	wash-tubs, basins, etc.

OFFICE USE.

5	baskets, waste.
17	books of reference.
1	book-case.
1,060	sheets card-board.
11	pounds card-board.
3	clocks.
17	chairs, stools, etc.

12	chair-bottoms.
3	cuspidors.
106	drawing instruments.
47	pans drawing material.
56	bottles drawing material.
1,095	dials for watch clock.
28,650	envelopes.
4	electrotypes.
4	pieces India rubber.
4	pieces India ink.
51	bottles ink.
27	pounds printer's ink.
24	leads for pencil.
2	bottles mucilage.
15 2/10	reams paper.
517	sheets paper.
92	pads.
630	pencils.
15	boxes paper fasteners.
3,076	paper fasteners.
95	gross pens.
6	boxes pins.
36	pencil and pen holders.
3	type-writers, hektograph, etc.
5	ribbons for type-writer.
5	fonts of type.
49½	pounds type metal.
18	spools tape.
16	gross rubber bands.
73	rubber stamps.
51¼	pounds roller composition.
34	boxes seals.
50	sheets stencil boards.
243	pounds sealing wax.
108	thumb-tacks.
8,000	tags.
1	McGill's staple press.

LABORATORY USE.

144	bottles and vials.
14	barometers and thermometers.
2,160	corks.
104	crucibles.
8	carboys.
6	gauge glasses.
24	glass tubes.
30	level glasses.
200	pounds zinc batteries.
127	parts of electric batteries.
28,835½	pounds acid.
8	gallons acid.
352¾	gallons alcohol.
1	gallon tincture of arnica.
40	pounds alum.
10	pounds aqua ammonia.

26	pounds beeswax.
100,686	pounds ground bone.
15	pounds borax.
2	pounds camphor.
25	pounds chalk.
15	pounds chlorides, various.
100	pints Pratt's chloride.
150	grains chloride of gold and sodium.
25	pounds copper and its preparations.
46	cans concentrated lye.
2,955	pounds glue.
286	pounds glycerine.
10	pounds gelatine.
160	pounds ground glass.
14	pounds gum arabic.
45	pounds gum tragacanth.
48	hand grenades.
150	pounds glauber salts.
284	gallons isinglass.
64¼	pounds iron and its preparations.
1	pound laudanum.
9	bottles liniment.
4½	gallons molasses.
118½	pounds mercury and its salts.
51	pounds spirits of niter.
37½	pounds nickel salts.
3	ounces nitrate of silver.
150	pounds oxides, various.
12,287	pounds sal soda.
3,156	pounds soda and its preparations.
21,800	pounds straw boards.
8	pounds sulphur.
115	pounds sal ammoniac.
2	barrels pitch.
2,636½	pounds potash, various.
419	reams paper.
34,471½	pounds paper.
8	rolls paper.
418	yards paper.
6	barrels tar.
5	pounds prepared tar.
1,238½	pounds tallow.

PAINTS, OILS, ETC.

4	pounds asphaltum.
162 ⅕	gallons benzine.
2	pounds bronze copper.
8	gallons coal tar.
60	gallons drier.
36,493	gallons gasoline.
353	pounds kalsomine.
94	pounds lampblack.
290	pounds lubricating compound.
92	pounds black lead.
20	pounds red lead.

15,238	pounds white lead.
45	pounds extract of logwood.
50	gallons lacquer.
621	gallons naphtha.
54	pounds nut-galls.
14½	gallons castor oil.
55	gallons cod-liver oil.
102	gallons dressing oil.
10	pounds dressing oil.
2,739½	gallons illuminating oil.
5,107½	gallons lubricating oil.
6	bottles lubricating oil.
1,398¼	gallons oil, mixing paints.
3,373⅛	pounds paint, dry.
5,813⅓	pounds paint, in oil.
6	gallons paint, in oil.
4,072	gallons petroleum and its products.
175½	pounds putty.
514	pounds shellac.
772½	gallons spirits of turpentine.
20	pounds turpentine.
157	gallons varnish.
4,663	pounds whiting.
250	pounds zinc.

MISCELLANEOUS.

1	row-boat.
2	barrels.
24	baskets.
785	paste-board boxes.
3,004	packing boxes.
1,714	tin boxes.
128	tin cans.
73½	pounds gutta percha.
222	boxes axle grease.
506½	pounds axle grease.
2	horses.
2	hose carts, reels, etc.
1,637	feet rubber hose.
8,005¼	pounds Japan wax.
571¾	pounds packing, various.
98	feet packing, various.
100	powder canisters, 2-pound.
250	powder canisters, 5-pound.
4	rubber aprons.
8	pairs rubber gloves.
10	rubber gaskets.
8	pairs rubber boots.
8	pairs rubber shoes.
298	rubber rings, etc.
58	pounds rubber valves.
½	pound rubber tubing.
136⅞	pounds rubber, sheet.
1,100	tickets, railroad and street car.
2	lap-robes.
6	whips.

10	parts of wagons.
24	finger cots.
1	mirror.
1,080	screw-tops for cans.
5,500	pounds fertilizers.
49	loads manure.
1	flag-staff.
1	wrought-iron water tank.
1	marble slab.

MACHINES.

3	lawn mowers.
4	steam boilers.
6	lathes.
1	lathe chuck.
4	steam engines.
1	lawn sprinkler.
1	gas-fitters' test pump, with gauge.
3	feed pumps.
1	feed-water heater.
1	wind-mill.
1	automatic knife grinder.
2	emery wheel tool grinder.
2	mortising and boring machines.
1	slotting-machine.
1	center grinder.
1	shaping machine.
1	pipe-cutting and threading machine.
1	drill machine.
1	gear-cutting machine.
1	paper-cutter, with extra knife.
1	type-writing machine, complete.
16	machines, various.
84	parts of machines.
232	parts of mowing-machines.

TOOLS, ETC.

206	awls.
1	ax.
80	bits.
1	set bits.
1	brace.
160	buckets.
1,553	brushes and sash tools.
416	carpenters' tools, various.
760	pounds chalk-lines.
14	coal-hods.
209	drills.
4	dies.
2,340	files.
40	forks (hay and manure).
4	gauges.
3,601	pounds grindstones.
1	grindstone, mounted.
71	hatchets and hammers.

797 handles, various.
27 hoes.
120 knives, saddlers', etc.
3 ladders.
4½ sets ladders.
11 machinists' tools, various.
87 pairs nippers.
150 papers needles.
95 oil-stones.
137 oil cups and oilers.
5 planes.
9 plows.
150 pounds plow points.
26 picks.
79 punches.
95 rakes.
594 rasps.
24 rivet-sets.
25 rules.
165 saddlers' tools, various.
28 sandstones.
85 spades and shovels.
60 stamps.
7 sets of stamps.
59 saws.
21 saw-blades.
6 sieves and sifters.
2 scales.
110 pairs of shears.
64 screw-drivers.
3 spirit levels.
53 scythes.
16 scythe-snaths.
89 scythe-stones.
3 tape-lines.
3 sets of taps.
2 trowels.
51 utensils, various.
123 wrenches.
38 wheelbarrows.
3 tinners' tools, various.
1 paint burner.
1 set tools for milling-machine.

APPENDIX 3.

STATEMENT OF ORDNANCE, ORDNANCE STORES, ETC., ISSUED TO THE MILITARY ESTABLISHMENT, INCLUDING THE NATIONAL HOMES FOR SOLDIERS OF THE VOLUNTEER AND REGULAR ARMY, AND EXCLUSIVE OF THE MILITIA, DURING THE FISCAL YEAR ENDED JUNE 30, 1888.

CLASS I.

14 Gatling guns, long, 10 barrel, caliber .45-inch.
3 Hotchkiss mountain guns, caliber 1.65-inch.
3 3-inch rifled guns.
6 3.2-inch B. L. steel rifled guns.
2 4.5-inch rifled siege guns.
1 12-pounder bronze gun.
1 5-inch breech-loading steel siege gun.
1 7-inch breech-loading steel siege howitzer.
1 15-inch Rodman gun.
2 10-inch siege mortars.

CLASS II.

7 Gatling gun carriages and limbers, metallic.
7 Gatling gun carriages and limbers, wood.
3 Hotchkiss mountain gun carriages.
9 3-inch gun carriages.
4 3.2-inch gun, steel carriages.
3 12-pounder gun carriages.
2 4.5-inch gun carriages.
1 5-inch gun steel carriage.
1 15-inch gun barbette carriage and chassis.
8 3-inch gun caissons and limbers.
1 battery wagon "C" and limber.
3 mortar beds.
1 mortar wagon and limber.

CLASS III.

42 harness bags.
2 budge-barrels.
2 elevating bars.
5 baskets for mortar implements.
1 forge bucket, wood.
2 sponge buckets, wood.
1 tar bucket, iron.
134 watering buckets, gutta-percha.

9 water buckets, iron.
6 water buckets, leather.
8 water buckets, papier maché.
10 water buckets, rubber.
6 cannon spikes.
1 breech cover, Hotchkiss gun.
3 dredging boxes.
3 fuse blocks.
2 fuse gauges.
9 fuse gouges.
1 fuse plug reamer.
9 fuse plug wrenches.
5 gunners' gimlets.
6 gunners' haversacks.
3 gunners' levels.
18 gunners' pincers.
3 gunners' quadrants.
22 gunners' sleeves.
14 handspikes, maneuvering.
19 handspikes, trail.
8 handspikes, shod, for mortar.
29 sets harness, 2 lead horses.
18 sets harness, 2 wheel horses.
1 set harness, Laidley cavalry forge.
1 set harness, mountain howitzer carriages.
4 common lanterns.
3 dark lanterns.
1 magazine lantern.
20 lanyards.
1 muzzle cover.
10 packing outfits.
39 paulins, 12 by 15 feet.
4 powder funnels.
32 powder measures.
12 powder scoops.
6 plummets.
15 plummet cords.
8 priming wires, field guns.
4 priming wires, siege guns.
29 prolonges.
2 quoins.
2 rammers and staves, 3.2-inch gun.
7 rammers and staves, 4.5-inch gun.
12 scrapers for shot.
100 securing stakes.
2 shell hooks.
2 breech sights, 4.5-inch gun.
4 breech sights, 8-inch rifle.
1 breech sight, 8-inch howitzer.
1 muzzle sight, 3.2-inch rifle.
2 muzzle sights, 4.5-inch gun.
4 muzzle sights, 8-inch rifle.
21 sponge covers, 3-inch rifle.
4 sponge covers, 3.2-inch rifle.
9 sponge covers, 12-pounder gun.
19 sponges and rammers, 3-inch rifle.

2 sponges and rammers, 3.2-inch rifle.
1 sponge and rammer, 6-pounder gun.
5 sponges and rammers, 12-pounder gun.
2 sponges and rammers, 24-pounder mortar.
14 sponges and staves, 4.5-inch gun.
19 thumbstalls.
14 tompions, 3-inch rifle.
3 tompions, 4.5-inch gun.
2 tompions, 24-pounder mortar.
6 tompions, 10-inch mortar.
4 tow hooks.
7 tube pouches.
33 vent covers.
14 vent pieces.
8 vent punches.
2 wipers for mortar.
13 worms and staves.

IMPLEMENTS FOR GATLING GUN.

7 cam extractors.
13 drifts.
23 feed guides.
28 feed magazines.
4 gun covers.
8 handspikes.
6 headless shell extractors.
7 pointing levers.
14 lock screw-drivers.
14 small screw-drivers.
14 T screw-drivers.
7 shell drivers.
14 wiping rods.
4 pointing-lever axis pin nuts.
14 oilers.
1 hopper.
3 sight cases.
7 cascabel plate wrenches.
3 lever nut wrenches.
13 pin wrenches.
7 rear-guide nut wrenches.
3 sets accessories for Hotchkiss ammunition wagon.
1 set reloading tools for Hotchkiss revolving gun.

CLASS IV.

50 30-pounder shot.
140 4.5-inch shot.
204 8-inch shot.
30 11-inch shot.
16 15-inch shot.
90 1.5-inch Hotchkiss cartridges.
800 1.5-inch Hotchkiss shell.
300 1.65-inch Hotchkiss shell.
565 3-inch shell.
1,100 3.2-inch shell.

250	12-pounder shell.
20	24-pounder shell.
150	5-inch shell.
150	7-inch shell.
211	8-inch shell.
82	10-inch mortar shell.
300	12-inch mortar shell.
48	13-inch shell.
315	3-inch case shot.
200	3.2-inch case shot.
60	3-inch canister.
40	3.2-inch canister.
250	12-pounder canister.

CLASS VI.

2,781	Springfield carbines, caliber .45.
1,132	Colt's revolvers, caliber .45.
20	Chaffee-Reece magazine rifles, caliber .45.
20	Hotchkiss magazine rifles, caliber .45.
20	Lee magazine rifles, caliber .45.
2,252	Springfield rifles, caliber .45.
10	Spencer repeating shotguns.
36	Springfield shotguns.
6	artillery officers' sabers.
15	artillery sabers.
290	cavalry sabers.
20	field and cavalry officers' sabers.
101	musicians' swords.
36	non-commissioned officers' swords.
269	hunting knives.

CLASS VII.

ARTILLERY ACCOUTERMENTS.

136	knapsacks.
97	saber belts.
99	saber-belt plates.

CAVALRY EQUIPMENTS.

2,998	canteen straps.
2,136	cartridge belts.
1,242	carbine slings.
947	carbine-sling swivels.
321	pistol cartridge pouches.
2,100	pistol holsters.
200	pistol pack boxes.
600	spring bands, brass.
1,000	truncated paper bands.
1,200	wooden upper cores.
858	saber attachments.
2,949	saber belts.
2,735	saber-belt plates.
1,049	saber knots.
271½	pairs saber straps.

INFANTRY EQUIPMENTS.

1,299	bayonet scabbards.
1,640	blanket bags.
24	blanket and coat straps.
751½	pairs blanket bag coat straps.
1,477	pairs blanket bag shoulder straps.
6,749	canteens.
1,106	canteen covers.
355	canteen corks and chains.
3,124	canteen straps.
6	carrying braces.
2,090	cartridge belts.
1,386	cartridge-belt plates.
2,770	cartridge boxes.
2	cartridge blocks.
2,311	clothing bags.
2,303	clothing-bag straps.
2,959	forks.
3,109	knives.
3,888	spoons.
13	frogs, bayonet scabbard.
44	frogs, sliding.
5,319	gun slings.
3,482	haversacks.
1,000	haversacks with web straps.
2,769	haversack straps.
20	magazine belts.
4,459	meat cans.
309	hunting-knife scabbards.
12	intrenching-tool scabbards.
4,433	tin cups.
26	non-commissioned officers' waist belts and plates.
2,805	waist belts.
2,376	waist-belt plates.

APPENDAGES.

4	brushes and thongs.
3,338	headless shell extractors.
2,130	jointed ramrods.
12	cleaning rods, shotgun.
2,208	screw-drivers, carbine and rifle.
410	screw-drivers, revolver.
20	screw-drivers, Lee rifle.
10	screw-drivers, shotgun.
5	wire scratch brushes.
20	wiping brushes, Lee rifle.
99	spring vises.
365	tumbler punches.
1	wiper, rod bayonet.
2,062	wiping rods, wood, carbine.
6,232	wiping rods, wood, rifle.
2	wiping rods, shotgun.

HORSE EQUIPMENTS FOR CAVALRY.

1,144	curb bridles.
2,007	watering bridles.
1,009	carbine boots and straps.
678	cinchas.
2,640	curry-combs.
273	cruppers.
31	forage sacks.
19	girths.
3,972	halters.
6,194	halter straps.
3,658	horse brushes.
599	horse covers.
2,222	lariats.
749	links.
65	mane combs.
3,899	nose bags.
1,472	picket pins.
430	saber straps for saddles.
1,084	saddles.
166	saddle-bags, canvas.
1,164	saddle-bags, leather.
4,732	saddle blankets.
20	saddle cloths.
873	side lines.
6	side-line fasteners.
2,636	spurs.
4,800	spur straps.
3,638	stirrups.
4	stirrups with guidon sockets.
972	stirrup straps.
2,404	surcingles.

CLASS VIII.

SMALL-ARM AMMUNITION.

1,004,400	carbine ball cartridges, caliber .45.
392,836	revolver ball cartridges, caliber .45.
252,490	revolver blank cartridges, caliber .45.
2,900,790	rifle ball cartridges, caliber .45.
251,080	rifle blank cartridges, caliber, .45.
20,000	rifle blank cartridges, caliber .50.
626,000	round balls, caliber .45.
2,350,512	carbine bullets, caliber .45.
312,000	revolver bullets, caliber .45.
4,586,451	rifle bullets, caliber .45.
76,687	pounds small-arms powder.
10,147,300	cartridge primers.
8,150	cartridge shells.
14,300	pounds shot.
22	shot-gun outfits, except tools and cases.
183,250	cartridge wads.

AMMUNITION FOR CANNON.

7,345	blank cartridges, 3-inch gun.
100	blank cartridges, 12-pounder gun.
74	1.5-inch cartridge cases.
875	metallic fuses.
751	paper fuses.
25	percussion fuses.
32	wooden fuses.
700	pounds cannon powder.
24,100	pounds hexagonal powder.
15	pounds mealed powder.
3,500	pounds mortar powder.
1,000	electric primers.
98,525	friction primers.

CLASS IX.

107	arm racks.
463	sharpshooters' badges.
183	bars for sharpshooter badges.
1	sling chain.
22	chocks.
1	crane.
231	signal flags.
1	gun lift.
129	haliards.
12	intrenching tools.
6,106	marksman's buttons.
2,680	marksman's pins.
3	marking rods, disks, and brushes.
246	shot marks and staves.
2	rail platforms, mortar.
6	rollers.
160	streamers.
2	trace ropes.

BRINTON TARGET AND PARTS.

15	targets, complete.
58	frames.

CUSHING TARGET AND PARTS.

21	targets, complete.
2	car frames.
4	cross pieces and uprights.
134	frames.
2	fish plates with bolts and nuts.
12	rails.
4	truck wheels and axles.

LAIDLEY TARGET AND PARTS.

228	targets, complete.
96	axles.
6	center blocks and pins.

296	cross pieces.
865	frames.
154	journal boxes.
36	journal-box pins.
20	journal posts.
186	keys for frames.
40	levers.
91	lever blocks.
196	nave boxes.
4	spring stops.
424	rails.
481	uprights.
70,040	paper targets.
1	sectional target.
10	Texas targets.
16	Texas target centers.
3	Texas target cross pieces.
6,192	target centers.
171	steel target frames.
954	wood target frames.
14,464,500	target pasters.
4	target plates for gallery practice.
10,666	cloth silhouettes.
63,187	paper silhouettes.
222,641	strings for skirmish target.

PARTS OF SHOT-GUN OUTFIT.

8	brush wipers.
86	powder canisters.
8	drifts.
7	field cases.
8	funnels.
8	powder and shot chargers.
8	priming tools.

RELOADING TOOLS, ETC.

32	sets bench tools.
16	sets hand tools.
24	combination anvils.
6	ball molds.
37	brush wipers.
11	adjustable chargers.
3	bench powder chargers.
9	crimping and reloading dies for revolver cartridges.
85	crimping and reloading dies for rifle cartridges.
1	cap for crimping die.
11	bench resizing dies.
8	resizing dies for revolver shell.
124	resizing dies for rifle shell.
27	drifts.
1	primer extractor.
65	primer extractor pins.
31	funnels.
3	gauges, total length.

22 ladles.
34 mallets.
35 oil cans.
55 priming tools.
9 priming-tool spindles.
8 reloading punches for revolver cartridges.
59 reloading punches for carbine and rifle cartridges.
90 resizing punches.
3 safety sockets.
8 shell extractors.
7 shell scrapers.
8 strainers.
30 wiping rods.
1 die wrench.

PRIMER-INSERTING TOOLS AND PARTS.

2 primer inserting tools, complete.
3 bushings.
1 pinion lever.
2 primer setters.
2 screws.

PRIMER-EXTRACTING TOOLS AND PARTS.

2 primer extracting tools, complete.
45 extractor pins.
1 spindle.
6 pin screws.

SHELL-RESIZING TOOLS AND PARTS.

2 shell resizing tools, complete.
1 base.
1 lower cross-bar.
43 dies, lower, rifle.
279 dies, upper, rifle.
10 dies, revolver.
1 ejecting wire.
2 lever-pin screws.
2 link-pin screws.
13 rings.
16 spindles.
1 spindle screw.
1 spindle-screw nut.
2 rod wrenches.

POWDER-CHARGING TOOLS AND PARTS.

2 chargers.
1 receiver and funnel.
1 receiver nut.
2 wrenches.

ASSEMBLING AND CRIMPING TOOLS AND PARTS.

1 assembling and crimping tool, complete.
17 dies.

1 die-lever pin.
1 shell rest.
1 shell-rest set screws.
12 stems.
2 stem screws.
2 stem-lever pin screws.
7 spindle screws.
1 check-lever spring.

CLASS X.

PARTS OF CLASS I.

12 sets DeBangs gas checks.
5 cups for gas check.
11 firing pins for Gatling gun.
1 obturator plate.
2 screw studs for rifle gun.
2 spindles and nuts for gas-check pad.
2 pairs of trunnion rings.
3 vent pieces.

PARTS OF CLASS II.

24 bolts and nuts.
24 bolts for pole-yoke collar.
8 spring brakes for field gun.
2 limber chests.
1 elevating screw.
5 keys for ammunition chest.
48 linchpins.
4 nave bands.
16 nuts for carriage.
23 poles.
5 pole yokes.
4 pole-prop sockets.
1 rail.
2 retraction ropes.
1 pair shafts.
6 stakes for mortar wagon.
29 stay pins.
26 stay-pin keys and chains.
1 stock, caisson.
1 stock, carriage.
2 tire bands.
20 tire bolts.
40 washers.
8 wheels, carriage.

PARTS OF CLASS III.

97 bridles, artillery.
13 bridle ornaments.
614 brass-plated buckles.
226 iron roller buckles.
31 collars.

4 girths for drivers' saddles.
105 halters, artillery.
80 halter chains.
50 halter straps.
1 pair hames.
25 hame straps.
52 double S hooks.
4 leg guards.
50 cold shut links.
20 pole pads.
26 pole straps.
10 rammer heads.
70 rosettes for artillery bridles.
1 drivers' saddle.
16 drivers' saddle seats.
6 sponge heads.
139 woolen sponges.
24 staples for valise saddles.
4 brass stirrups.
20 stirrup straps.
11 lead traces.
13 wheel traces.
233 whips.

PARTS OF CLASSES IV AND V.

700 base plugs for shell.
100 sabots for 15-inch shot and shell.

PARTS OF CLASS VI.

Springfield carbine.

7 bands.
15 band springs.
146 bridles.
156 bridle screws.
132 breech-block cap-screws.
105 butt-plates.
5 butt-plate covers.
12 butt-plate screws.
140 cam latch springs.
31 cover springs.
26 cover-spring screws.
31 cover-friction springs.
25 cover stud pins.
306 ejector springs.
306 ejector-spring spindles.
60 extractors.
262 firing pins.
140 firing-pin screws.
152 front sights.
245 front-sight covers.
30 front-sight cover-screws.
8 hammers.
2 lock plates.
60 mainsprings.

16 mainspring swivels.
20 mainspring swivel-rivets.
25 pistol-grip screws.
692 rear sights.
146 rear sight base-screws.
20 rear sight-leaves.
12 rear sight-leaf slides.
42 sears.
152 sear-screws.
92 sear springs.
32 sear-spring screws.
12 side screws.
328 stocks, assembled.
42 stocks, spring-fitted.
696 stocks, wood part.
207 swivels.
32 swivel-bars.
44 swivel-bar rings.
20 tang screws.
79 tumblers.
194 tumbler-screws.

Springfield rifle.

351 lower bands.
79 upper bands.
180 band springs.
145 bayonets.
20 bayonet clasps.
48 bayonet-clasp screws.
100 bayonet-clasp stop-screws.
12 breech-block caps.
153 breech-block cap screws.
262 bridles.
757 bridle screws.
103 butt plates.
254 butt-plate screws.
6 butt-plate cover screws.
477 cam-latch springs.
1,965 ejector springs.
1,373 ejector spring spindles.
306 ejector studs.
5,195 extractors.
5,327 firing pins.
1,575 firing-pin screws.
62 front-sights.
90 front-sight covers.
181 front-sight cover screws.
114 front-sight pins.
126 guard bows.
170 guard bow nuts.
341 guard bow swivels.
269 guard bow swivel screws.
123 guard plates.
959 guard screws.
302 hammers.
475 hinge pins.

77 locks.
131 lock plates.
326 mainsprings.
644 mainspring swivels.
424 mainspring swivel rivets.
118 pistol-grips.
393 pistol-grip screws.
36 ramrods.
232 ramrod stops.
467 rear sights.
121 rear sight base screws.
20 rear sight slide screws.
319 rear sight screws.
588 sears.
379 sear screws.
527 sear springs.
482 sear spring screws.
576 side screws.
194 side-screw washers.
332 stocks, wood part.
520 tang screws.
263 tips.
307 tip screws.
594 triggers.
212 trigger screws.
753 tumblers.
417 tumblers, swiveled.
864 tumbler screws.
1 windage screw-head.
1 windage-screw head pin.

Springfield shotgun.

1 barrel.
268 extractors.
5 mainsprings.
1 receiver.
1 stock.
2 tumblers.

Spencer repeating shotgun.

1 cartridge stop.
2 cartridge stop-pin screws.
1 extractor.
1 firing pin.
1 firing-pin spring.
1 magazine spring.
1 mainspring.
1 sear spring.
2 slide-plate screws.

Parker shotgun.

5 mainsprings.
16 plungers.
14 plunger springs.
4 tumbler screws.

Hotchkiss magazine rifle.

20	extractors.
20	mainsprings.

Lee magazine rifle.

4	extractors.
4	extractor-springs.
4	firing pins.
100	magazines.
20	magazine springs.
4	mainsprings.
4	sear springs.

Colt's revolver.

111	back straps.
880	back-strap screws.
997	bolts.
985	bolt screws.
1	barrel.
515	center pins.
347	center-pin bushings.
375	center-pin catch-screws.
659	center-pin screws.
21	cylinders.
661	ejector heads.
582	ejector rods.
931	ejector springs.
369	ejector tubes.
820	ejector-tube screws.
332	firing pins.
326	firing-pin rivets.
51	frames.
169	front sights.
109	gates.
105	gate catchers.
304	gate-catch screws.
344	gate springs.
105	guards.
1,322	guard screws.
1,108	hammers.
148	hammer-cams.
286	hammer rolls.
396	hammer-roll rivets.
815	hammer-screws.
696	hands.
792	hand-springs.
773	mainsprings.
705	mainspring screws.
76	recoil plates.
32	sear springs.
38	sear-spring screws.
1,548	sear and stop-bolt springs.
1,477	sear and stop-bolt spring screws.
350	stocks.

291 stop-bolts.
937 triggers.
875 trigger screws.

Schofield-Smith & Wesson revolver.

1 hammer.
1 hand-spring.
1 strain-screw.
26 triggers.

12 mouth pieces for cavalry saber scabbard.
1 scabbard for musician's sword.
2 scabbards for non-commissioned officers' swords.

PARTS OF CLASS VII.

98 curb-bits.
24 bridle headstalls.
24 pairs bridle-reins.
162 bridle ornaments.
7,931 brass-bar buckles.
2,620 brass-wire buckles.
1,573 iron-bar buckles.
1,927 iron-roller buckles.
198 cincha straps.
1,108 coat-straps.
617 curb-straps.
10,620 brass escutcheon-pins.
364 halter-bolts.
3 halter-chains.
245 halter-rings.
650 halter-squares.
430 japanned nails.
938 ovals.
1,306 brass rings.
224 iron D-rings.
896 iron rings.
25 brass shields.
518 double-spring lariat-snaps.
72 canteen-strap snaps.
89 link-snaps.
10 side-line chains.
372 side-line fasteners.
126 saber-belt slides and hooks.
20 pairs saber-belt slings.
44 saddle-bag studs.
1,088 brass foot-staples.
2,684 brass staples for rings.
10⅓ yards webbing, 3½ inches wide.
59⅓ yards webbing, 4 inches wide.

PARTS OF CLASS VIII.

1,530 cartridge bags, 6-pounder gun.
500 cartridge bags, 12-pounder gun.
2,787 cartridge bags, 3-inch gun.

500 cartridge bags, 3.2-inch gun.
1,500 cartridge bags, 4.5-inch gun.
485 cartridge bags, 8-inch gun.
500 cartridge bags, 10-inch gun.
20 cartridge bags, 10-inch mortar.
300 cartridge bags, 15-inch gun.
110 fuse plugs, brass.
100 fuse plugs, wood.
50 water caps.

PART SECOND.

CLOTH, ROPE, THREAD, ETC.

20,092⅓ yards cotton cloth.
5 pounds cotton cord.
50 pounds cotton waste.
32¾ pounds sash cord.
200 feet braided sash cord.
10 pounds curled hair.
10 pounds marline.
40 pounds rope.
605 pounds thread.
635 pounds tow.
47 pounds twine.

IRONMONGERY.

19¾ pounds sheet brass.
2 brass clamps.
37½ pounds copper.
15,694 horse-shoes.
644 pounds bar iron.
1,448 pounds horse-shoe nails.
940 pounds iron nails.
305 padlocks.
60 brass rivets and burrs.
147½ pounds brass rivets and burrs.
618½ pounds copper rivets and burrs.
85½ pounds iron rivets and burrs.
134 gross brass screw pins.
203 7/12 gross brass screws.
29½ gross iron screws.
421 pounds steel.
11,200 copper tacks.
1 paper copper tacks.
33¼ pounds copper tacks.
3,196,400 iron tacks.
12 papers iron tacks.
99 11/48 pounds iron tacks.
40 pounds toe-calks.
40 pounds copper wire.
10 pounds iron wire.
70 pounds zinc.

LEATHER, ETC.

800	sides bridle leather.
20½	feet collar leather.
23,589	pounds harness leather.
171½	quarts leather blacking.
28½	pounds leather polish.
303¾	pounds black wax.
13	ounces bristles.
102	boxes ingredients for leather blacking.

LUMBER, ETC.

1,600	feet boards.
1,482	feet scantling.
491	feet timber.

CLEANING, HEATING, AND LIGHTING.

12	bath bricks.
108	corn brooms.
9	dusting brushes.
5	feather dusting brushes.
122	button brushes.
52	button sticks.
37	pounds candles.
113	chamois skins.
10	boxes cleaning material.
20	cleaning plates.
14,250	pounds coal.
45½	quires crocus cloth.
5	pounds emery.
1,035⅚	quires emery cloth.
3½	quires emery paper.
2	lanterns.
104½	ounces scouring material.
6	pounds pomade.
426	pounds rottenstone,
62½	quires sandpaper.
25	pounds bar soap.
2,483½	pounds castile soap.
275	pounds sponge.
610	papers tripoli.
298	ounces whiting.
195	pounds whiting.

MATERIAL FOR OFFICE USE.

8	half-boxes blacking for stencil outfit.
78	instruction books.
1	stencil brush.
25	pounds hektograph composition.
352	ounces indelible ink.
1	hektograph.
6	door mats.
2	marking outfits.
2	sets marking outfit screws.

25 boxes stencil paste.
2 seal stamps.
110 pounds sealing-wax.
20 stencil plates, letters, and figures, sets.
3 stencil outfits (sets).

LABORATORY STORES.

13 gallons alcohol.
81½ pounds beeswax.
10 pounds borax.
5 pounds chalk.
15 pounds glue.
23 pounds straw board.
50 pounds tallow.
1,172 pounds Japan wax.
5 gallons whisky.

OILS, PAINTS, ETC.

3 quarts browning mixture.
65 gallons coal-tar.
25 quarts cosmolubric.
20 gallons Japan drier.
50 gallons lacker.
20 pounds lampblack.
25 pounds black lead.
125 pounds white lead.
12 pounds extract logwood.
121⅝ gallons cosmoline oil.
4,418 pounds harness oil.
20 gallons kerosene oil.
5 gallons lard oil.
268⅝ gallons linseed oil.
95½ gallons neat's-foot oil.
40 gallons neutral oil.
568¾ gallons sperm oil.
517½ pounds black paint.
890 pounds brown paint.
75 pounds green paint.
637½ pounds lead-color paint.
1,764 pounds olive paint.
5 pounds vermillion paint.
10 pounds putty.
202 gallons turpentine.
5 pounds umber.

MISCELLANEOUS.

6 tool bags.
12 metallic powder barrels.
12 chair bottoms.
5 cleaning material boxes.
9 boxes for forge and battery wagon stores.
14 packing boxes.
8 reloading tool boxes.
7 tin cans.

22	chamois skin saber cases.
289	arm chests.
2	tool chests.
184	cans axle grease.
130	pounds axle grease.
215	pounds wheel grease.
12	halliards.
450	barrel hoops.
3	powder kegs.
300	pounds packing paper.
177	pounds petroleum paper.
110	pounds stencil paper.

MACHINES AND PARTS OF MACHINES.

6	crusher pressure gauges.
100	cylinder pressure gauges.
1	star gauge.
1	engine lathe.
1	milling machine.
1	planing machine.
1	profiling machine.
1	inspecting mirror.
3	dies for gas-check pad.

TOOLS.

11	anvils.
149	aprons.
8	augers.
1,144	awls.
219	awl handles.
24	patent awl handles.
19	axes.
48	ax handles.
69	assorted bits.
25	sets of bits.
5	lead-punching blocks.
1	iron boiler.
5	shoeing boxes.
10	braces.
246	assorted brushes.
10	assorted buckets.
7	buttresses.
1	calipers.
7	chalk-lines.
102	assorted chisels.
7	saddlers' clamps.
23	claw tools.
6	clinching irons.
40	compasses.
13	iron creasers.
87	wooden creasers.
12	dies.
1	die stock with dies.
5	dust pans.

63	edged tools.
1,147	files.
193	file handles.
6	cavalry forges.
2	forge chests.
4	fullers.
1	funnel.
3	gauges.
16	draw gauges.
24	gimlets.
2	glue pots.
2	gouges.
2	grindstones.
1	grindstone arbor and crank.
1	grindstone stand.
220	assorted hammers.
13	sledge hammers.
39	hammer handles.
10	hatchets.
19	hardies.
8	saddlers' horses.
367	assorted knives.
13	gauge knives.
15	splitting knives.
78	mallets.
7	mauls.
1	nail claw.
5,928	needles.
96	nippers.
4	oil cans.
3	oil droppers.
34	oil stones.
1	sewing palm.
12	carpenters' pencils.
2	pickaxes.
8	pickax handles.
81	pincers.
16	planes.
33	pliers.
12	pointing stakes.
2	pokers.
26	pricking carriages.
83	pricking wheels.
19	pritchels.
153	assorted punches.
5	nail punches and clinch knives.
49	spring punches.
1,003	rasps.
7	reaping hooks.
2	riveting irons.
5	rivet sets.
2	rounding irons.
64	rules.
62	sandstones.
14	sash tools.
10	saws.

3	saw-sets.
2	scrapers.
50	screw-drivers.
1	scriber.
16	scythes.
4	scythe snaths.
12	scythe stones.
67	shears.
2	pairs rubber shoes.
19	shovels.
15	slickers.
18	pairs magazine slippers.
12	spades.
2	spokeshaves.
24	squares.
28	taps.
38	thimbles.
15	ticklers.
106	tongs.
6	tuyere irons.
35	vises.
2	watering pots.
2	wheelbarrows.
54	wrenches.

APPENDIX 4.

STATEMENT OF ORDNANCE, ORDNANCE STORES, ETC., DISTRIBUTED TO THE MILITIA FROM JULY 1, 1887, *TO JUNE* 30, 1888, *UNDER SECTIONS* 1661 *AND* 1667, *REVISED STATUTES UNITED STATES.*

CLASS I.

7 3-inch wrought-iron guns.
6 Gatling guns, 10 barrels, long, caliber .45.

CLASS II.

7 carriages and limbers for 3-inch guns.
6 carriages and limbers for Gatling guns, caliber .45.
2 carriages and limbers (metallic) for Gatling guns, caliber .45.
2 caissons and limbers for 3-inch guns.

CLASS III.

6 fuse blocks.
6 fuse cutters.
2 fuse gouges.
2 fuse wrenches.
29 gunners' haversacks.
7 gunners' gimlets.
6 gunners' pincers.
25 handspikes, trail.
4 harness sacks.
84 lanyards.
47 priming wires.
6 prolonges.
12 pole-pads.
15 paulins, 12 by 15 feet.
6 pendulum hausses.
6 pendulum hausse pouches.
4 pendulum hausse seats.
21 sets artillery harness, 2 horses, lead.
34 sets artillery harness, 2 horses, wheel.
8 sponge-buckets, iron.
10 sponges and rammers, 6-pounder gun.
22 sponges and rammers, 3-inch rifle.
10 sponge covers, 6-pounder gun.
32 sponge covers, 3-inch rifle.
12 sponge heads, 3 inch rifle.
2 sponge heads, 12-pounder mountain howitzer.

84 thumbstalls.
1 tar bucket, iron.
33 tube-pouches.
6 tow hooks.
15 tompions.
17 vent-covers.
6 vent-punches.
24 worms and staves.
2 water buckets.

IMPLEMENTS FOR GATLING GUNS.

111 feed cases.
66 feed magazines.
12 gun covers.
8 handspikes.
6 hammers, riveting.
8 oilers.
4 sight cases.
6 screw wrenches.

CLASSES IV AND V.

70 10-inch shot.
34 10-inch shell.
25 10-inch mortar shell.
13 12-pounder canister, filled and fixed.
12 12-pounder case-shot, filled and fixed.
25 6-pounder case-shot, filled and fixed.
25 6-pounder canister, filled and fixed.
20 3-inch shot.
20 3-inch shot, fully prepared.
20 3-inch time shell, fully prepared.
25 3-inch case-shot, filled and fixed.
20 3-inch case-shot, fully prepared.
25 3-inch canister, filled and fixed.
20 3-inch canister, fully prepared.
100 3-inch shell.
200 3-inch Parrott shell.
100 3-inch percussion shell, fully prepared.
145 3-inch Hotchkiss time fuse shell.
25 3-inch Hotchkiss percussion shell, fully prepared.
80 3-inch Hotchkiss case-shot.

CLASS VI.

8,526 Springfield rifles, caliber. 45.
216 Springfield cadet rifles, caliber. 45.
371 Springfield carbines, caliber. 45.
218 Colt's revolvers, caliber. 45.
201 officers' swords.
14 non-commissioned officers' swords.
4 musicians' swords.
56 sabers, light artillery
528 sabers, light cavalry.
26 sabers, cavalry officers.

1	sword, major-general.
1	sword, brigadier-general.
170	bayonets.

CLASS VII.

7,903	combination screw-drivers.
7,903	headless shell extractors.

HORSE EQUIPMENTS FOR CAVALRY.

649	curb bridles, cavalry.
255	pairs spurs and straps.
500	cavalry saddles, leather.
80	cavalry saddles, rawhide.
347	artillery saddle blankets.
364	cavalry saddle blankets.
30	saddle cloths, hair.
31	saddle cloths, officers.
75	pairs sweat-leathers.
211	halters and straps.
161	pairs saddle-bags.
1	bridle, watering.
6	horse brushes.
41	nose-bags.
41	lariats.
41	picket-pins.
1	crupper.
1	horse-cover.
1	link and snap.
1	side-line.
1	stirrup with hood.
50	bridle reins.

INFANTRY EQUIPMENTS.

5,277	bayonet scabbards.
2,500	blanket bags.
2,500	pairs blanket-bag shoulder straps.
2,500	pairs coat straps.
1,450	canteens and straps.
150	cartridge belts and plates.
5,468	cartridge boxes.
295	cartridge belts, woven.
9,556	gun slings.
6,650	haversacks and straps.
7,145	waist belts and plates.
700	waist belts.
10	waist belts and plates, non-commissioned officers.
7	shoulder belts and plates, non-commissioned officers.
2,200	meat cans.
720	tin cups.
920	knives.
920	forks.
1,108	spoons.

ARTILLERY ACCOUTERMENTS.

90	artillery saber belts and plates.

CAVALRY EQUIPMENTS.

571	carbine slings.
571	carbine sling swivels.
200	carbine boots and straps.
155	pistol holsters.
52	pistol cartridge pouches (cap pouches).
890	saber belts and plates.
158	saber knots.
136	saber attachments.
400	cartridge belts.
24	sword belts and plates, officer's.

CLASS VIII.

125	blank cartridges, 12-pounder gun.
300	blank cartridges, 10-pounder gun.
800	blank cartridges, 6-pounder gun.
2,000	blank cartridges, 3-inch rifle.
1,258,000	rifle ball cartridges, caliber .45.
714,000	rifle ball cartridges, caliber .50.
425,000	rifle blank cartridges, caliber .45.
9,000	rifle blank cartridges, caliber .50.
14,000	carbine ball cartridges, caliber .45.
56,000	revolver ball cartridges, caliber .45.
1,000	revolver blank cartridges, caliber .45.
1,000	primed cartridge shells, caliber .45.
20,000	lubricated rifle bullets.
90,000	round balls (140 grains) caliber .45.
20,500	cartridge primers.
14,920	friction primers.
25	fuses, time, metallic.
300	fuses, time, paper.
150	fuses, time, wood.
125	fuse plugs, time.
105	fuse plugs, percussion.
25	cartridge bags, 10-inch siege mortar.
50	cartridge bags, 10-inch Rodman gun.
500	pounds cannon powder.
600	pounds mortar powder.
7	pounds musket powder.
200	pounds small-arms powder.

MISCELLANEOUS.

466	arm-chests.
25	adjustable chargers.
40	boxes cleaning material.
12	chamois-skins.
371	jointed ramrods.
200	marksman's buttons.
301,000	pasters.

4,600	paper targets.
12	padlocks for limbers and chests.
2	pounds browning mixture.
5	pounds harness oil.
10	pounds polish for leather.
2	pounds scouring material.
2	quires emery-cloth.
2	quires emery-paper.
2	quires sand-paper.
10	sharpshooters' badges.
1	set reloading tools.
8,557	wiping-rods, wooden.
2	resizing dies, extra.

PARTS OF SPRINGFIELD RIFLE. CALIBER .45.

75	bridles.
75	bridle screws.
4	breech screws.
42	breech-blocks.
20	breech-block cap-screws.
5	butt plates.
220	butt-plate screws.
6	band springs.
40	bayonet-clasp screws.
70	cam latches.
512	cam-latch springs.
600	ejector springs.
450	ejector-spring spindles.
1,300	extractors.
1,420	front sights.
1,400	front-sight covers.
1,420	front-sight pins.
3,050	firing pins.
700	firing-pin screws.
10	guard bows.
20	guard-bow nuts.
250	guard-bow swivels.
225	guard-bow swivel screws
3	guard plates.
7	guard screws.
235	hammers.
236	hinge pins.
100	hinge-pin studs.
1,431	lower bands.
143	locks.
45	lock-plates.
235	mainsprings.
275	mainspring swivels.
210	mainspring swivel rivets.
1,518	rear sights.
36	rear-sight slides.
30	rear-sight base screws.
20	rear-sight joint screws.
40	rear-sight leaf screws.
311	ramrods.

60	ramrod stops.
37	stacking swivels.
1,175	sears.
100	sear screws.
650	sear springs.
500	sear-spring screws.
523	side screws.
100	side-screw washers.
444	spring vises.
81	stocks, complete.
200	stocks (wood part).
22	stocks, assembled.
573	tumblers.
906	tumbler screws.
2,448	tumbler punches.
307	tang screws.
35	thumb-pieces.
150	upper bands.
25	upper-band screws.

PARTS OF SPRINGFIELD CARBINE, CALIBER .45.

5	swivel bars.
5	swivel rings.

PARTS OF COLT'S REVOLVER, CALIBER .45.

210	bolt springs.
10	firing pins.
10	gate springs.
10	gate catches.
25	hands.
25	hand-springs.
10	hammers.
10	hammer cams.
10	hammer screws.
210	sear springs.

TOOLS, ETC.

1	anvil, smiths'.
2	aprons, leather.
4	axes, felling.
6	shovels, smiths'.
6	shovels, long-handled.
6	spades.

APPENDIX 5.

STATEMENT OF ORDNANCE, ORDNANCE STORES, ETC., DISTRIBUTED TO COLLEGES FROM JULY 1, 1887, TO JUNE 30, 1888, UNDER SECTION 1225 REVISED STATUTES UNITED STATES, AS AMENDED BY ACT APPROVED JULY 5, 1876.

CLASS I.

1	6-pounder bronze gun.

CLASS VI.

500	Springfield cadet rifles, caliber .45.
15	swords, non-commissioned officers'.

CLASS VII.

700	bayonets cabbards.
700	cartridge boxes.
700	waist belts and plates.
20	waist belts and plates, non-commissioned officers'.
24	shoulder belts and plates, non-commissioned officers'.
23	frogs, sliding, non-commissioned officers'.

CLASS VIII.

250	blank cartridges for 12-pounder gun.
400	blank cartridges for 10-pounder gun.
500	blank cartridges for 6-pounder gun.
1,250	blank cartridges for 3-inch gun.
28,000	carbine ball cartridges, caliber .45.
29,000	carbine blank cartridges, caliber .45.
1,000	carbine ball cartridges, caliber .50.
1,000	carbine blank cartridges, caliber .50.
1,000	rifle ball cartridges, caliber .50.
3,000	rifle blank cartridges, caliber .50.
6,900	friction primers.

APPENDIX 6.

STATEMENT OF ORDNANCE STORES ISSUED TO THE EXECUTIVE DEPARTMENTS DURING THE YEAR ENDED JUNE 30, 1888, *UNDER THE PROVISIONS OF THE ACT OF MARCH* 3, 1879.

TO THE TREASURY DEPARTMENT.

2	Gatling guns, caliber .45.
5	carriages, without limbers, for Gatling gun, caliber .45.
10	Springfield rifles.
8	Springfield carbines.
10	bayonet scabbards.
10	cartridge boxes.
10	gun slings.
10	waist belts and plates.
16,600	rifle ball cartridges.
600	carbine ball cartridges.
500	hand grenades.
1	arm chest.

TO THE POST-OFFICE DEPARTMENT.

409	Colt's revolvers.
4,800	revolver ball cartridges.
4	arm chests.

APPENDIX 7.

REPORT OF ACTION TAKEN UNDER THE ACT OF MARCH 3, 1881, *DURING THE FISCAL YEAR ENDED JUNE* 30, 1888.

SOLD TO E. I. DU PONT DE NEMOURS & CO.

1887.
Sept. 20. 103 pounds brown prismatic powder (scrap), at 8 cents per pound. .. $8.24

PURCHASED FROM E. I. DU PONT DE NEMOURS & CO.

1887.
Nov. 29. 300 pounds square powder, at 25 cents per pound 75.00

APPENDIX 8.

SHOWING STATIONS AND DUTIES OF THE OFFICERS OF THE ORDNANCE DEPARTMENT ON OCTOBER 1, 1888.

Rank and name.	Duty.	Address.
BRIGADIER-GENERAL.		
Stephen V. Benét	Chief of Ordnance	Washington, D. C.
COLONELS.		
1. S. Crispin, brevet	Commanding the Benicia Arsenal	Benicia, Cal.
2. T. G. Baylor, brevet	Commanding the Rock Island Arsenal	Rock Island, Ill.
3. J. M. Whittemore	Commanding the Watervliet Arsenal	West Troy, N. Y.
LIEUTENANT-COLONELS.		
1. A. R. Buffington	Commanding the National Armory	Springfield, Mass.
2. D. W. Flagler, brevet	Commanding the Frankford Arsenal	Philadelphia, Pa.
3. A. Mordecai, brevet	Commanding the New York Arsenal, President of the Ordnance Board, and President of Board for Testing Rifled Cannon, etc.	Governor's Island, New York City. Post-office box 1449.
4. F. H. Parker, brevet	Commanding the Watertown Arsenal, and Member of Board for Testing Rifled Cannon, etc.	Watertown, Mass.
MAJORS.		
1. J. P. Farley	Member of the Ordnance Board, and Member of Board for Testing Rifled Cannon, etc.	Governor's Island, New York City. Post-office box 1449.
2. L. S. Babbitt	Commanding the San Antonio Arsenal, and Chief Ordnance Officer Department of Texas.	San Antonio, Tex.
3. W. A. Marye	Assistant National Armory	Springfield, Mass.
4. I. Arnold, jr	Commanding the Fort Monroe Arsenal	Fort Monroe, Va.
5. C. Comly	Commanding the Indianapolis Arsenal	Indianapolis, Ind.
6. J. R. McGinness, brevet	Assistant, Rock Island Arsenal	Rock Island, Ill.
7. G. W. McKee, brevet	Commanding the Allegheny Arsenal	Pittsburgh, Pa.
8. F. H. Phipps	Commanding the U. S. Powder Depot	Dover, N. J.
9. J. W. Reilly	Commanding the Augusta Arsenal	Augusta, Ga.
10. J. A. Kress, brevet	Assistant, Benicia Arsenal	Benicia, Cal.
CAPTAINS.		
1. O. E. Michaelis, brevet	Commanding the Kennebec Arsenal	Augusta, Me.
2. C. E. Dutton	On duty under the Interior Department.	Geological Survey, Washington, D. C.
3. J. G. Butler	Commanding the Saint Louis Powder Depot.	Jefferson Barracks, Mo.
4. C. Bryant	Assistant, Frankford Arsenal	Philadelphia, Pa.
5. A. L. Varney	Assistant, Rock Island Arsenal	Rock Island, Ill.
6. J. C. Clifford	Assistant, National Armory	Springfield, Mass.
7. J. E. Greer	Member of the Ordnance Board, and Member of Board for Testing Rifled Cannon, etc.	Governor's Island, New York City. Post-office box 1449.
8. J. Pitman	Commanding the Fort A. Lincoln Ordnance Depot, and Chief Ordnance Officer Department of Dakota.	Fort A. Lincoln, Dak.
9. C. Shaler	Assistant, Watervliet Arsenal	West Troy, N. Y.
10. H. Metcalfe	Instructor of Ordnance and Gunnery, U. S. Military Academy.	West Point, N. Y.

SHOWING STATIONS AND DUTIES OF THE OFFICERS OF THE ORDNANCE DEPARTMENT—Continued.

Rank and name.	Duty.	Address.
11. W. S. Starring	Commanding the Vancouver Barracks Ordnance Depot, and Chief Ordnance Officer Department of the Columbia.	Vancouver Barracks, Wash. Ter.
12. C. S. Smith	Principal Assistant in the Ordnance Bureau.	Washington, D. C.
13. S. E. Blunt	Inspector of Rifle Practice at the headquarters of the Army.	Washington, D. C.
14. F. Heath	Assistant, Watervliet Arsenal	West Troy, N. Y.
15. D. M. Taylor	On special duty in the office of the Adjutant-General.	Washington, D. C.
16. D. A. Lyle	On foundry duty, Member of Board on Life-Saving Apparatus, etc., under the Secretary of the Treasury, and Member of Board for testing Rifled Cannon, etc.	Boston, Mass. Post-office box 2253.
17. J. Rockwell, jr	Assistant, Rock Island Arsenal	Rock Island, Ill.
18. J. C. Ayres	Assistant, Watervliet Arsenal	West Troy, N. Y.
19. M. W. Lyon	Commanding the Cheyenne Ordnance Depot, and Chief Ordnance Officer Department of the Platte.	Cheyenne, Wyo. Ter.
20. C. W. Whipple	Commanding the Fort Leavenworth Ordnance Depot, and Chief Ordnance Officer Department of the Missouri.	Fort Leavenworth, Kans.
21. A. H. Russell	Assistant, Frankford Arsenal	Philadelphia, Pa.
22. R. Birnie, jr	On duty in the office of the Chief of Ordnance.	Washington, D. C.
23. I. MacNutt	Assistant, Watertown Arsenal	Watertown, Mass.
24. C. C. Morrison	Assistant to the Ordnance Board	Governor's Island, New York City. Post-office box 1449.
25. F. Baker	Assistant, Frankford Arsenal	Philadelphia, Pa.
26. O. B. Mitcham	Assistant Instructor of Ordnance and Gunnery, U. S. Military Academy.	West Point, N. Y.
FIRST LIEUTENANTS.		
1. H. D. Borup	On foundry duty	Boston, Mass. Post-office box 2253.
2. L. L. Bruff	Assistant, Watervliet Arsenal	West Troy, N. Y.
3. C. H. Clark	Assistant, National Armory	Springfield, Mass.
4. William Crozier	On duty in the office of the Chief of Ordnance.	Washington, D. C.
5. W. B. Gorden	Assistant, Watervliet Arsenal	West Troy, N. Y.
6. F. E. Hobbs	On foundry duty	Station G, Philadelphia, Pa.
7. D. A. Howard	Assistant to the Ordnance Board	Governor's Island, New York City. Post-office box 1449.
8. S. E. Stuart	On foundry duty	Station G, Philadelphia, Pa.
9. J. Walker Benét	Assistant, National Armory	Springfield, Mass.
10. W. W. Gibson	On foundry duty	Station G, Philadelphia, Pa.
ORDNANCE STOREKEEPERS—CAPTAINS.		
A. S. M. Morgan	On duty, Allegheny Arsenal	Pittsburgh, Pa.
W. H. Rexford	On duty, Indianapolis Arsenal	Indianapolis, Ind.
D. J. Young	On leave	Washington, D. C.
M. J. Grealish	On duty, Augusta Arsenal	Augusta, Ga.
V. McNally	On duty in the office of the Chief of Ordnance.	Washington, D. C.

APPENDIX 9.

ANNUAL REPORT OF INSPECTOR OF ORDNANCE AT MIDVALE STEEL WORKS.

MIDVALE STEEL WORKS,
Philadelphia, Pa., July 30, 1888.

SIR: I have the honor to submit the following report upon the work done for the Ordnance Department by The Midvale Steel Company during the fiscal year ending June 30, 1888:

During this period the company continued the fabrication of forgings for 3.2-inch steel breech-loading field guns, under their contract of February 19, 1887, for twenty-five sets of such forgings; and, in addition, furnished the Department a few small forgings for parts of breech mechanism which were required for immediate use.

The forgings for field guns have been completed and the contract closed; they are similar to those which have heretofore been made for such guns, and which have been so frequently described in former reports that no further account of them seems necessary at this time. The physical qualities of the accepted forgings have been excellent, as will be seen by examination of the subjoined tables giving the results of test of specimens from those forgings accepted during the fiscal year.

Results of tensile test of tangential specimens from ends of tubes for* 3.2-*inch steel breech-loading field guns.

[Length of specimen, 2 inches; sectional area, 0.2 of a square inch.]

Number of tube.	Breech of muzzle.	Number of specimen.	Elastic limit per square inch of original section.	Elongation per inch under strain at elastic limit.	Tensile strength per square inch of original section.	Elongation after rupture.	Reduction of area after rupture.
			Pounds.	*Inch.*	*Pounds.*	*Per cent.*	*Per cent.*
30	Breech	3	48,000	.001600	86,300	25.00	37.1
30	do	4	47,000	.001450	85,450	27.00	49.1
30	Muzzle	3	47,000	.001750	86,900	22.50	49.1
30	do	4	49,000	.001800	85,850	20.50	49.1
31	Breech	*1	49,000	.001850	86,050	18.00	27.4
31	do	*2	50,000	.001800	87,400	15.00	23.9
31	Muzzle	*1	48,000	.001650	85,800	23.50	37.1
31	do	*2	48,000	.001650	87,050	21.00	43.3
31	Breech	3	50,000	.001700	84,600	24.50	37.1
31	do	4	49,000	.001650	82,550	24.50	43.3
31	Muzzle	3	50,000	.001750	85,900	21.00	46.2
31	do	4	48,000	.001500	84,900	21.00	49.1
34	Breech	3	48,000	.001550	86,550	19.00	43.3
34	do	4	50,000	.001850	89,000	23.00	43.3
34	Muzzle	3	52,000	.001800	90,550	20.50	46.2
34	do	4	45,000	.001650	84,850	20.50	46.2
36	Breech	1	43,000	.001400	80,100	25.50	46.2

* Not accepted on these results; retempered and annealed.

Results of tensile strength of tangential specimens from ends of tubes, etc.—Continued.

Number of tube.	Breech of muzzle.	Number of specimen.	Elastic limit per square inch of original section.	Elongation per inch under strain at elastic limit.	Tensile strength per square inch of original section.	Elongation after rupture.	Reduction of area after rupture.
			Pounds.	*Inch.*	*Pounds.*	*Per cent.*	*Per cent.*
36	Breech	2	43,000	.001400	81,950	25.50	40.3
36	Muzzle	1	48,000	.001550	84,500	24.50	43.3
36	...do	2	47,000	.001500	81,900	20.00	46.2
37	Breech	1	47,000	.001550	88,900	22.00	43.3
37	...do	2	48,000	.001650	87,600	21.50	43.3
37	Muzzle	1	43,000	.001500	80,700	25.00	49.1
37	...do	2	44,000	.001550	82,950	22.50	49.1
38	Breech	3	49,000	.001600	88,550	20.50	34.0
38	...do	4	48,000	.001700	87,900	20.00	30.7
38	Muzzle	3	47,000	.001650	82,300	24.00	40.3
38	...do	4	46,000	.001500	82,100	24.00	40.3
39	Breech	3	44,000	.001500	84,050	25.00	49.1
39	...do	4	44,000	.001500	83,050	26.50	51.9
39	Muzzle	3	44,000	.001500	80,400	26.50	46.2
39	...do	4	45,000	.001450	81,000	25.50	46.2
40	Breech	*1	50,000	.001700	87,150	20.00	30.7
40	...do	*2	49,000	.001650	86,050	22.50	46.2
40	Muzzle	*1	46,000	.001700	87,900	20.00	37.1
40	...do	*2	42,000	.001550	81,850	23.00	37.1
40	Breech	*3	43,000	.001500	83,450	25.00	43.3
40	...do	*4	44,000	.001600	82,550	19.50	30.7
40	Muzzle	*3	43,000	.001500	83,700	19.50	43.3
40	...do	†4	46,000	.001600	87,850	19.00	37.1
40	Breech	†5	55,000	.001800	87,350	19.00	37.1
40	...do	†6	53,000	.001750	87,550	17.50	37.1
40	Muzzle	†5	50,000	.001600	90,400	17.00	37.1
40	...do	6	50,000	.001650	89,900	18.00	43.3
41	Breech	1	50,000	.001800	92,050	19.50	40.3
41	...do	2	51,000	.001750	89,300	23.50	43.3
41	Muzzle	1	45,000	.001500	83,800	26.50	46.2
41	...do	2	45,000	.001450	85,100	23.00	37.1
43	Breech	9	47,000	.001400	88,200	21.50	46.2
43	...do	10	47,000	.001550	85,450	26.00	46.2
43	Muzzle	9	48,000	.001450	89,800	20.50	46.2
43	...do	10	47,000	.001550	88,650	21.00	49.1

* Not accepted on these results; retempered and annealed.
† Not accepted on these results; reannealed and then accepted without further test.

Results of tensile test of tangential specimens from jackets for 3.2-inch steel breech-loading field guns.

[Length of specimen, 2 inches; sectional area, 0.2 of a square inch.]

Number of jacket.	Number of specimen.	Elastic limit per square inch of original section.	Elongation per inch under strain at elastic limit.	Tensile strength per square inch of original section.	Elongation after rupture.	Reduction of area after rupture.
		Pounds.	*Inch.*	*Pounds.*	*Per cent.*	*Per cent.*
27	5	52,000	.001800	100,100	20.50	37.1
27	6	52,000	.001750	99,150	21.00	37.1
40	*1	48,000	.001700	96,450	21.50	37.1
40	*2	48,000	.001650	95,400	20.00	37.1
40	3	55,000	.001950	107,050	18.50	34.0
40	4	54,000	.001950	104,450	19.00	37.1
44	*1	46,000	.001500	91,350	20.00	40.3
44	*2	51,000	.001750	95,600	15.00	20.5
44	†3	54,000	.001800	101,200	20.00	40.3
44	†4	55,000	.001950	101,950	15.00	20.5
44	5	52,000	.001750	94,050	19.00	40.3
44	6	52,000	.001800	95,050	17.00	27.4

* Not accepted on these results; retempered and annealed.
† Not accepted on these results; reannealed.

Results of tensile test of tangential specimens from trunnion-hoops for 3.2-inch steel breech-loading field-guns.

[Length of specimen, 2 inches; sectional area, 0.2 of a square inch.]

Number of trunnion-hoop.	Number of specimen.	Elastic limit per square inch of original section.	Elongation per inch under strain at elastic limit.	Tensile strength per square inch of original section.	Elongation after rupture.	Reduction of area after rupture.
		Pounds.	*Inch.*	*Pounds.*	*Per ct.*	*Per ct.*
33	*1	47,000	.001650	91,800	21.50	37.1
33	*2	46,000	.001550	89,100	25.00	37.1
33	3	53,000	.001700	100,900	16.00	27.4
33	4	50,000	.001750	97,500	18.50	23.9
34	*1	47,000	.001500	89,950	21.50	34.0
34	*2	47,000	.001700	90,250	22.00	34.0
34	†3	55,000	.001900	100,300	18.00	27.4
34	†4	52,000	.001600	99,000	15.00	23.9
34	5	54,000	.001800	96,050	18.50	30.7
34	6	52,000	.001750	92,200	23.00	37.1
35	*1	47,000	.001600	92,550	19.50	34.0
35	*2	49,000	.001850	94,600	21.00	37.1
35	3	56,000	.001950	102,600	21.00	37.1
35	4	54,000	.001800	100,150	16.00	23.9
36	*1	49,000	.001650	92,750	21.00	40.3
36	*2	47,000	.001650	90,400	19.50	40.3
36	3	52,000	.001800	95,550	20.50	37.1
36	4	57,000	.001900	98,400	18.00	34.0
44	*1	46,000	.001600	88,800	21.50	37.1
44	*2	47,000	001500	89,850	19.50	40.3
44	3	51,000	.001800	97,300	18.50	34.0
44	4	55,000	.001850	100,450	17.00	34.0
48	5	52,000	.001700	95,850	24.50	34.0
48	6	53,000	.001650	96,400	23.00	43.3

* Not accepted on these results; retempered and annealed.
† Not accepted on these results; reannealed.

The small breech mechanism forgings referred to were produced promptly, and were of satisfactory quality. The following list shows their nature:

Two forgings for gas-check cups for 5-inch rifle and two forgings for gas-check cups for 7-inch howitzer.

Two steel forgings for pressure gauges.

One gas-check cup forging for 3.2-inch steel field-gun.

One steel forging for spindle and head for 3.2-inch steel field-gun.

Five forgings for gas-check cups for 3.2-inch steel field-guns.

Steel forgings for breech mechanism of 8-inch and 10-inch steel rifles, viz, one hinge block, one segmental gear, and eighteen bolts.

Some of these forgings were accepted without test, the metal and treatment being satisfactory to the Department. So many of them as were tested showed the following results:

Name of forging.	Number of specimen.	Position in which specimen was taken.	Elastic limit per square inch of original section.	Elongation per inch under strain at elastic limit.	Tensile strength per square inch of original section.	Elongation after rupture.	Reduction of area after rupture.	Specific gravity.	Hardness.
			Pounds.	*Inch.*	*Pounds.*	*Per ct.*	*Per ct.*		
Gas-check cups for 5 and 7 inch guns.	1	Tangentially	85,000	.003000	145,250	11.00	23.9	.....	.....
	2	...do	84,000	.002850	145,400	10.00	23.9	.....	.....
Pressure gauges	2	Longitudinally	62,000	.002050	131,900	11.50	13.2	7.8389	26.51
Gas-check cups for 3.2-inch field guns.	3	Tangentially	75,000	.002550	126,800	12.50	23.9	.....	.....

No new contracts for gun material have been made during the year, there having been no funds available for that purpose on account of the non passage by Congress of any bill making appropriation for the armament of fortifications.

There has consequently been comparatively little to do at this place in the way of constant daily inspection work; the time available for other work has been well employed, it is thought, in the preparation of the first draught of specifications governing the manufacture of forgings for steel guns of all calibers; in completing the record of the manufacture of all the steel forgings which have been purchased by the Department, and in preparing the blank forms for future records. The draught of specifications has been submitted to you for such revision as may be deemed advisable or necessary; the experience of the Department and of this office during the past five years, as well as the information on file in the Ordnance Office, in respect to the requirements of other countries have all been considered in drawing up these specifications, while the strength and security of the built-up structures have been kept in mind. It is thought that under these specifications the United States will, with intelligent inspection of the manufacture, be reasonably certain to obtain reliable material for gun construction; that the guns themselves will possess sufficient strength and power, while at the same time steel manufacturers possessing a suitable plant will be able to fairly fill the specifications with very little difficulty and at a reasonable price. The amount of testing required has been reduced to a minimum.

F. E. HOBBS,
Lieutenant, Ordnance Department, U. S. Army.

The CHIEF OF ORDNANCE, U. S. ARMY,
Washington, D. C.

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APPENDIX 10.

REPORT ON THE MAXIM GUN.

(2 plates.)

ORDNANCE BOARD, U. S. ARMY,
New York Arsenal, June 20, 1888.

SIR: In accordance with instructions contained in letter of March 1, 1888, from your office, to test the Maxim Machine Gun, the Board has the honor to submit the following report:

In company with Mr. Broderick Clote, a director of the Maxim Gun Company, the Board proceeded to the proving ground at Sandy Hook, where the operation of the gun was explained by Mr. Clote. The piece was then operated by him to substantiate the claim for its simplicity of construction, and the certainty and rapidity of its action. The cartridges used were made by the Winchester Repeating Arms Company and were furnished by the Maxim Gun Company. The supply having been exhausted, the gun was formally turned over to the Board for trial. With the gun tested by the company there was turned over another differing from it only in having a shorter barrel and being without a water jacket.

DESCRIPTION.

This gun may properly be described as automatic, no force other than that of the recoil developed by the discharge being required for its complete operation, that is, for opening the breech, extracting the empty shell, withdrawing a cartridge from the belt in which the cartridges are delivered to the gun, cocking the piece, inserting the cartridge in the chamber, closing the breech, and placing a cartridge in position to be utilized at the next round. The first four operations are performed directly by the recoiling barrel and its connections, which, at the same time, place a heavy coiled spring under a strain of extension. The spring by its re-action returns the barrel to its original position and performs the last three of the above-mentioned operations. The barrel is screwed into a metal frame, which has a reciprocating motion in a rectangular casing inclosing the breech mechanism. The lock—which is also the breech-block—has a reciprocating motion in the frame independent of that of the latter in the casing. An eccentric crank is journaled in the sides of the frame near its rear. A link connects the crank with a fork, the branches of which are pivoted in the sides and near the front of the lock. When the breech is closed the link and fork are in the prolongation of the axis of the bore and the axes of crank and bore are in the same plane. The lock or breech-block is thus supported at the instant of fire. The crank extends clear through both sides of the casing and

has a motion of translation in slots cut in its sides. Its left extremity terminates in an eccentric cam over which a small chain connecting with the spiral recoil spring is wound. The spring is attached at its front to the exterior of the casing. To the right extremity of the crank there is attached a curved arm or lever which, when the barrel and frame recoil, comes in contact with another lever firmly secured to the casing. The curvature of these levers is such as to cause the crank to rotate slowly at first, but with a gradually accelerated motion, and to wind up the chain at the left, thus putting a strain of extension on the recoil spring. This rotation of the crank depresses the link and with it the body of the fork. A rearward motion is at the same time communicated to the fork by which the lock is withdrawn from the face of the breech with an accelerated motion corresponding to that of the crank. A spring-stop on the side of the breech-casing limits the forward rotation of the crank-handle and by its elasticity causes the handle to rebound, thus relieving the recoil spring from the work of rotating it backward. Another stop combining with it the functions of a catch limits the rearward rotation of the handle and prevents it from rebounding to the front. This catch readily yields when the system recoils and leaves the crank free to rotate.

THE LOCK.

The lock consists of a box or casing containing a tumbler, sear, mainspring and firing-pin and an additional or safety sear. The tumbler is a bent lever pivoted near its middle. The upper arm engages in a notch cut on the under surface of the firing-pin and serves as a retractor. By means of the other arm the lock is cocked as the rear end or body of the fork before referred to, which now performs the functions of a cocking-lever, comes in contact with it in its descent and rotates the tumbler until the nose of the sear drops into the notch on its face. This rotation of the tumbler at the same time retracts the firing-pin. The mainspring, is of the V pattern, one branch being somewhat shorter than the other. The longer branch enters a notch cut on the under surface of the firing-pin while the other bears against the tumbler.

The retraction of the firing-pin has the effect of compressing the mainspring, and the release of the tumbler by the sear causes the pin to move under the action of the spring. In order, however, that there may be no accidental explosion before the breech is closed a safety sear is provided. This sear is pivoted at its front above the firing-pin and is kept in contact with it by a flat spring. A shoulder on the upper surface of the pin comes in contact with a lug on the under surface of the sear. When the breech is completely closed the fork or cocking-lever is in line with the axis of the bore. Just before reaching this position it comes in contact with the lower surface of the safety sear and raises it so as to free the lug from the shoulder on the pin. The piece is then ready to be fired.

The trigger consists of a lever pivoted to the rear of the breech-casing and connected with a grooved slide at its bottom. A spiral spring connects the front end of the slide with the front of the casing and returns the slide to position when it has been withdrawn. When the trigger-lever is pressed in toward the casing the slide is drawn to the rear and the shoulder forming the front end of the groove comes in contact with the sear, which extends into the groove, and trips it. If the trigger-lever be held pressed in by the hand or by any attachment the firing is continuous.

The extractor, which is external to the casing of the lock and has a vertical sliding motion along its face, is an under cut or flanged slide of a width sufficient to take in the head of a cartridge. It is automatically operated by two bent levers pivoted near their centers to the sides of the lock. One arm of each lever engages in grooves cut on the exterior of the extractor. The other arms in the forward movement of the lock are depressed by arms on the fork at right angles to it, which strike against lugs on the interior of the breech-casing.

THE FEED.

The cartridges are carried side by side in belts made of two pieces of water-proofed tapes riveted together, leaving spaces large enough for single cartridges. The belts in general resemble the service cartridge-belts, though they are longer, each containing 334 cartridges. They are carried automatically through the feed-box by a bell-crank lever, one arm of which engages in a notch cut in the upper surface of the left side of the sliding-frame near its junction with the barrel, while the other engages with a slide moving through the feed-box at right angles to the barrel, and provided with two fingers which, as the barrel recoils, move back and drop behind a cartridge. When the barrel is returned to its original position the slide moves forward and the fingers by bearing against the cartridge carry it forward, and with it the belt, until the cartridge is in position parallel to but above the axis of the bore. As the barrel completes its forward movement the extractor rises, its face sliding over the base of the cartridge and its under-cut grooves embracing the rim of the cartridge head. In the completion of its vertical motion a spring on the inside of the breech casing enters a notch cut in the right side of the extractor and holds it in position. If the lock be now withdrawn, which can be done by means of a handle on the eccentric crank, the extractor will draw the cartridge from the belt. If a shell be in the chamber it will also be withdrawn. In its rearward motion the extractor is prevented from falling by two projecting arms which rest on guide-lugs on the inner sides of the breech-casing. Near the end of its backward motion the arms on the extractor pass over the lugs and the extractor falls, partly under the influence of gravity and partly under that of a light spring in the upper part of the breech-casing, through a distance equal to that of the axis of the cartridge in the belt above the axis of the barrel. Shell and cartridge are securely held in their relative positions by lugs, beveled on their upper edge, on springs attached to the rear face of the extractor, the lugs projecting through openings beyond its front face.

On the return of the block to its first position the cartridge enters the chamber and the empty shell the ejecting tube, the axis of which is as much below the axis of the barrel as that of the cartridge in the belt is above it.

On the completion of the forward movement of the block the extractor again rises, sliding over the head of the empty shell, which is now released, and along the head of the cartridge in the chamber, and engages with another in the belt which, unless the piece has been fired, must first be pulled forward by hand to bring the cartridge in position above the axis of the barrel.

WATER JACKET.

For those guns intended for long-continued firing a water jacket is provided. This is a brass casing surrounding the barrel, except for a short distance from the muzzle, and provided with a stuffing-box at each

end to admit of motion of the barrel without loss of water. The casing has a filling-hole, ordinarily closed by a screw-plug, near its rear end. A vent near the front end permits escape of steam whenever it is generated. In order that there may be no loss of water through the vent when firing at an angle of depression, a pipe is placed within and near the top of the casing, connected with this pipe, which extends the entire length of the casing, and at right angles to it there is another pipe leading to and closely fitting the vent. Openings are left at each end of the main pipe by which communication is made with the interior of the casing. Within this pipe there is a double-ended plunger. This, when the axis of the piece is other than horizontal, slides to the lower end of the pipe and closes the orifice. Steam but not water can then escape by the upper orifice.

A spiral spring surrounds that part of the barrel within the casing. It serves to hold the glands of the stuffing-boxes in position.

TO OPERATE THE GUN.

To operate the gun, the end of the cartridge-belt is passed from right to left through the feed-box slide. The lock is then withdrawn by means of the crank-handle and the cartridge-belt pulled through until the first cartridge comes into position above the axis of the bore. The lock is then returned to position, when the extractor rises and engages with the first cartridge in the belt. The lock is again withdrawn, and with it this cartridge. The belt is then pulled forward until the second cartridge comes into position over the axis of the barrel. The lock is again returned to position, by which movement the first cartridge is carried forward into the chamber and the second is seized by the extractor. The piece may then be fired by pressing on the trigger-lever. If the firing is to be continuous the lever is held down.

Should a cartridge miss fire it may be drawn from the chamber by means of the crank-handle, but the belt should be pulled forward by hand until the next cartridge comes into position, since, as there would be no recoil, there could be no movement of the feed-box slide and consequently no movement of belt and cartridges.

Should it be necessary to remove the lock it may be done in a few seconds, as the cocking-lever is connected by an interrupted screw-thread with the link attached to the eccentric crank.

TESTS OF THE GUN.

The gun not being adapted to the present service cartridge with 500-grain bullet, folded-head copper-case cartridges with 405-grain bullet were furnished the Board for the trial. On attempting to fire them it was found that they were not properly supported by the lock, and that they burst through the fold or swelled very badly at the head.

A few brass cartridges made in 1876 by the United States Cartridge Company, Lowell, Mass., being on hand, they were next tried. They appeared to vary in size, and in many instances entered the chamber with such difficulty as to stop the operation of the gun.

Solid-head copper case cartridges with 405-grain bullet were then asked for by the Board. On trial it was found that they missed fire to the extent of about 8 per cent., due, it was thought, to the weakness of the main-spring, the service primer requiring a very heavy blow of the firing-pin to explode it.

In order that it might make a thorough test of the principle of the gun, the Board requested that a supply of the last-named cartridges, but primed with the Winchester primer, might be furnished. These cartridges having been received, the test was resumed, with the following results:

Number of cartridges in belt.	Number fired.	Time.	Target.	Remarks.
		Seconds.		
290	290	27.5	Fired to sea.	Gun mounted on carriage.
100	99	9.25		First cartridge missed fire. Struck by firing-pin near edge of primer.
50	50	4.75		Fired singly.
25	25	.....		
290	290	27.25		
100	100	9.25		
			Yards.	
334	37	.....	1,000	Sighting shots. Telephone not working satisfactorily, firing at this range was suspended.
	71	6.75	200	Lock caught and did not close breech. Cause not ascertained at time.
	97	9.25	200	Lock caught and did not close breach. Lock removed and mainspring pivot found loose and projecting beyond side face of lock to such an extent as to prevent lock sliding in its grooves in frame. Cause, breaking of small stay wire through outer end of pivot.
334	20	.....	1,000	Sighting shots. Struck 20 yards short. Elevation used, 1,100 yards.
	20	.....	1,000	Sighting shots. Struck 6 feet above and 20 feet to right of point aimed at. Elevation used, 1,200 yards.
	20	.....	1,000	Sighting shots. One miss-fire. Struck below point aimed at. Elevation used 1,175 yards. Sight jarred down to 1,150 yards.
	20	.....	1,000	Sighting shots.
246 / 334	580	.....	1,000	An attempt was made to fire 580 rounds, noting accuracy and time, two belts being used. Box containing second belt was placed on ground outside of wheel, in order that no time should be lost in changing boxes. After 150 rounds one miss-fire. Cartridge thrown out by operating crank by hand. In feeding second belt two hitches occurred, owing to inability of feeding apparatus to raise long column of cartridges from ground, an operation for which the gun was not designed. Accuracy, owing to stops, etc., not particularly good.
334	332	.....	200	All struck in rectangle 4 feet by 4 feet 3 inches. Two miss-fires. Last 242 rounds fired in 22 seconds.
334	332	.....	Fired to sea.	Operation of gun checked at fortieth round by cartridge entering feed-box obliquely and preventing barrel from returning to firing position. Two miss-fires while firing remainder of cartridges in belt.
334	334	.....		Gun worked perfectly.
334	334	.....		One miss-fire.

The guns having been sent for by the owners the tests were discontinued.

ADVANTAGES OF THIS GUN.

As this gun works automatically but one man is required to control its operation. The mounting is of such a character as to admit of the gun being elevated or depressed and at the same time traversed from right to left, or the reverse.

This is not a feature peculiar to the Maxim gun, but is found in many of the machine guns in the United States service. The dirigibility of the latter, however, is somewhat affected by the power applied at the crank-handle to fire them, which is not the case with the Maxim gun.

By means of two handles at the rear of the breech-casing the firer can readily change the direction of the gun without removing his thumbs from the trigger-lever; that is, without stopping the firing.

The gun is light, compact, and not complicated in construction, considering the many functions it has to perform.

The one tested by the Board was somewhat imperfect in construction. The lock did not run true in its grooves in the frame, and consequently the primers were struck at the side instead of centrally, thus causing, in connection with the weakness of the main-spring, frequent miss-fires. If "hang-fires" occur no mishap results, as there can be no recoil and no opening of the breech until the discharge takes place.

DISADVANTAGES.

The method of assembling the lock is objectionable. The pins with securing wires should be replaced by screws similar to that through the tumbler, except that the heads should be slotted clear across so as to avoid the use of a fork screw-driver. No means exist of showing whether the lock is cocked or not, and none are provided to throw it out of action. Unless the trigger be pulled after closing the breech the lock will remain cocked and the main-spring compressed.

If the gun be set aside in this condition for some time the spring may take a permanent set. This, it was thought, happened to the main-spring in one of the locks furnished with the gun.

Without presenting it as a material objection, it may be well to state that the system necessitates the use of solid-head cartridges, as the interval of time, about one-eleventh of a second, between successive shots is so short that the breech system begins to recoil and the shell to be withdrawn before the bullet has left the bore. The shell there forms, as it were, a continuation of the chamber, and has by its inherent strength to sustain the then existing pressure of the gas.

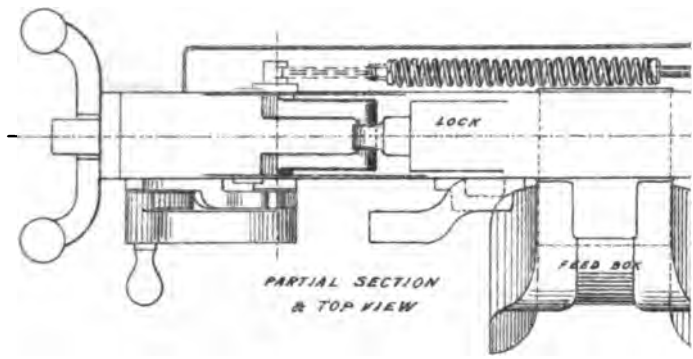
CONCLUSION.

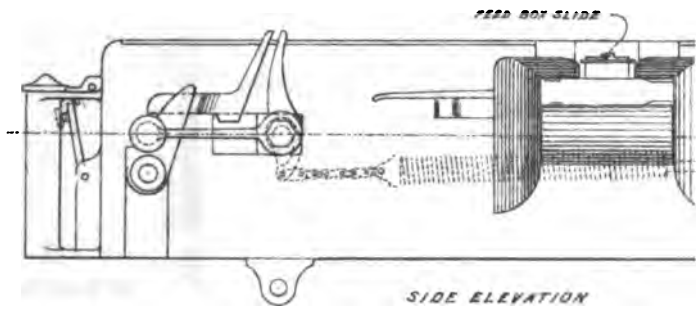
In view of the fact that this gun is compact, portable, not complicated in construction, easily directed, requires but few men for its service, is extremely rapid, and, so far as the limited trials indicate, certain in its action, the Board would respectfully recommend that one gun, adapted to the standard service ammunition, be procured for a more extended trial of the system, as the withdrawal of the gun before the Board sooner than was expected prevented the thorough and exhaustive test contemplated.

A. MORDECAI,
Lieut. Colonel, Ordnance Dept., U. S. Army,
President of the Board.
J. P. FARLEY,
Major, Ordnance Dept., U. S. Army.
JOHN E. GREER,
Captain, Ordnance Dept., U. S. Army.

The CHIEF OF ORDNANCE, U. S. ARMY,
Washington, D. C.

THE MAXIM GUN





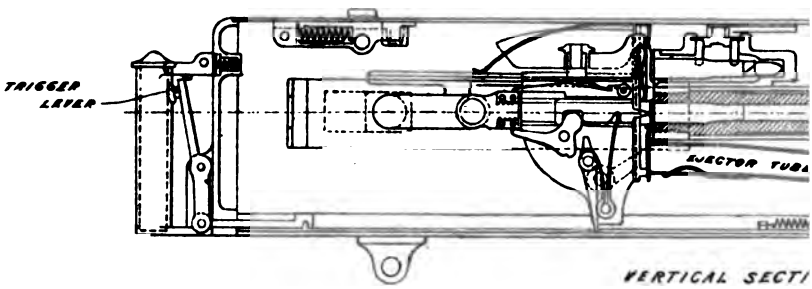


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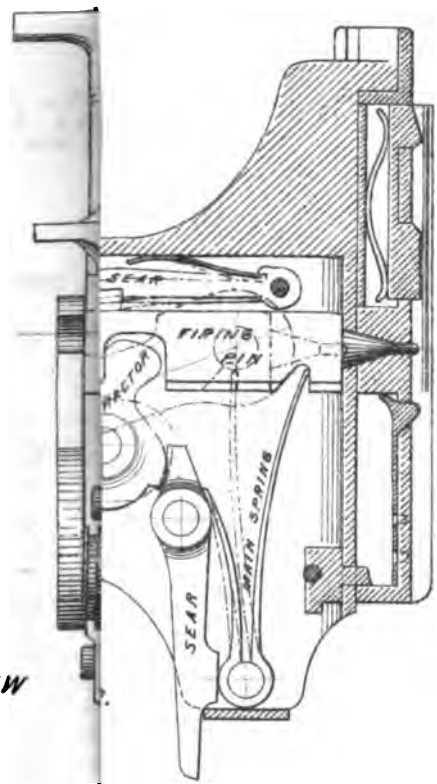
PLATE II



REAR VIEW

APPENDIX 11.

DESCRIPTION OF AND INSTRUCTIONS FOR THE MANAGEMENT OF THE FIFTEEN-INCH SMOOTH-BORE GUN AND CARRIAGES, TABLE OF RANGES, DESCRIPTIVE PLATES, ETC.

By the ORDNANCE BOARD U. S. ARMY.

(2 plates.)

15-INCH SMOOTH-BORE MUZZLE-LOADING GUN.

The gun is fully described in the Ordnance Manual for 1861, page 18.

PRINCIPAL DIMENSIONS.

Caliber	inches..	15
Length of bore	do....	165
Distance from face of muzzle to axis of trunnions	do....	120.45
Total length of gun	do....	190
Weight of gun	pounds..	49,099

No preponderance.

The sights are two in number, one placed on the breech and one on the upper surface of the piece in front of the trunnions.

The breech sight consists of a brass limb, secured by screws to the upper surface of the gun in a vertical plane through the axis of the bore, and at 55.55 inches from the axis of the trunnions, measured on a line parallel to the axis of the bore. It is 16.625 inches in height, and has a longitudinal slit with three holes 0.2 inch in diameter, one at each end of the slit and one at the middle point, with intervals of 2.25 inches between the sight holes.

The front sight is a single piece of brass fastened to the gun by two screws, its upper extremity terminating in a blade.

The elevations are given by means of an arc and index, the former attached to the base of the breech and the latter to the elevating fulcrum on the carriage.

Projectiles.—The shell is 14.85 inches in diameter. It has two ears at the extremities of a diameter at right angles to the axis of the fuse hole. Thickness of the shell, 2.5 inches.

The solid or cored shot is also provided in like manner with ears for the shell hooks.

Weight of shell, 330 pounds; weight of shot, 450 pounds.

Charges are of sphero-hexagonal powder, having a granulation of 100 to the pound and specific gravity of 1.800; the pressure with no charge to exceed 28,000 pounds per square inch.

Weight of full charge, 130 pounds.

The paper time-fuses are used with the water-capped, metallic fuse plug, or with the wooden fuse plug.

The implements and equipments required are as follows:

IMPLEMENTS AND EQUIPMENTS.

For service of gun.

2 sponges.
2 rammers.
2 pass boxes.
2 carrying bars.
2 shell hooks.
1 gunner's pouch.
1 primer pouch.
2 lanyards.
2 thumbstalls.
2 priming wires.
1 water tub.
1 elevating bar.
1 tompion.
1 vent cover.
1 crane.
1 differential pulley (1,000 pounds).
1 ladle.
1 worm.
2 gunner's gimlets.
1 gunner's pincers.
1 gunner's quadrant, brass.
2 vent punches.
} To 6 pieces or less.

For service of carriage.

4 maneuvering bars.
1 pinch bar.
1 retraction rope, ⅝-inch steel wire, 20 feet long.
1 set floor boards.

TOOLS.

For service of shells.

1 Fuse plug extractor.
1 Fuse mallet.
1 Fuse setter, brass.
1 Fuse cutter, knife.
1 Fuse wrench, for water cap.
1 Fuse reamer, for wooden plug.

For service of carriage.

1 screw wrench, large.
1 double wrench for 4½ and 3¼ inch nuts.
1 double wrench for 2 and 1⅝ inch United States standard nuts.
1 single wrench for 1¼-inch old style nuts.
1 hammer, claw.
} For 6 pieces or less.

ALTERED SEA-COAST CARRIAGES, MODEL 1883, WITH HYDRAULIC CYLINDERS, FOR 15-INCH GUN.

(2 plates.)

In order to strengthen the old 15 inch barbette carriage, that it may resist the strains caused by increasing the powder-charge of the gun to 130 pounds, and to adapt it to the 11-inch rifle, and also to facilitate its manipulation, the following alterations have been made:

TOP CARRIAGE.

Inner braces have been inserted between the cheek-plates, to give additional stiffness.

A buffer-plate has been added to the front transom, to receive the shock caused by running the carriage into battery.

The number and strength of the transoms have been increased; the front and rear ones having guide-hooks attached to restrict the motion of the carriage on the chassis.

A heavy cross-head has been added to the rear transom, connected with the front and middle transoms by two cross-head braces. This cross-head, extending as it does below the line of the upper surface of the chassis rails, is so slotted that it may receive and retain the piston-rod of the hydraulic cylinder.

The front and rear of the cheek-plates have been extended by means of bronze plates, which act as boxes for the steel truck-wheels, the front ones working in journals and the rear ones on an eccentric axle; the system being so arranged that the carriage shall always move with rolling friction, except for a distance of about 6 inches from the front buffers; the eccentric axle permits rolling friction for the whole distance when it is desired.

For the old cast-iron elevating fulcrum there has been substituted one of wrought iron, arranged with steps for the convenience of the gunner, and also with an eye for attaching the pulley for the "retraction rope."

The additional alterations required for the carriages used with the 11-inch rifle are the trunnion-bed plates, made to receive the eccentric trunnion-rings attached to the gun, to overcome the preponderance, and the replacing of the elevating fulcrum by bronze elevating arcs and gears.

CHASSIS.

Two kinds of chassis are altered. One with the narrow rail and the other with the deep rail. To make the chassis of equal height bracket bolsters are added to the narrow rails at the front, middle, and rear; the rear bracket bolster is deep enough to allow not only for the difference in depth of the two kinds of rails, but also to permit of the use of the old narrow-rail traverse wheels.

The other alterations of the chassis are common to the two carriages, and are the following:

The insertion of vertical braces between the plates of the rails to give additional stiffness.

The addition of an inclined rail on top of each rail of the chassis to cause an increasing resistance of the carriage when recoiling; and also to facilitate its running into battery.

The addition of an hydraulic cylinder, connected to the two rails by circular-bent straps, which also act as additional transoms.

This cylinder contains a piston-head perforated with four circular holes, three-quarters of an inch in diameter.

The piston-rod passes through a gland in the rear cylinder-head, and also through a slot in the cross-head, the end terminates in an eye, through which passes a steel pin, bearing two steel rollers to permit the easy adjustment of the piston-rod when the carriage ascends the inclined rails.

The addition of two buffer transoms, one attached to the front of the rails and the other to the rear, each being supplied with four rubber buffers to take up the shock when the carriage runs to the extreme limits of the rails.

To stiffen the rails of the chassis several transoms are added in rear of the hydraulic cylinder.

The addition of a wrought-iron prop and screw to the middle of each rail to permit of easy adjustment of the bearings due to a want of level of the platform.

Heavy wrought-iron bolsters are placed under the front of each rail. These bolsters are firmly bolted to the pintle transom and each rests on two conical rollers, which roll upon a plate on the platform, for ease and convenience of traversing.

The addition of a retraction apparatus placed at the rear end of the rails for the purpose of moving the carriage from battery. This con

sists of a drum revolved by means of gearing, to which the retraction rope is attached.

The addition of a retaining apparatus, consisting of a pawl and lever, the pawl engaging the teeth of the rack on the top carriage. This is so arranged with a steel spring that in its normal condition it will always retain the top carriage at the point where it may be left by the recoil. By pulling the lever and releasing the pawl the carriage will, owing to the inclined rails, readily run into battery. The lever may be held back by means of a pin, and it would be well that this should be done when maneuvering the carriage by hand.

The crane has been transferred from the top carriage to the chassis rail, it being arranged so that it will be in a position to load when the carriage has recoiled to any point beyond 4 feet and 6 inches from the front, and 7 inches from the rear buffers.

For the better convenience of the cannoneers, side and rear platforms of wire netting are added.

PRECAUTIONS TO BE OBSERVED.

The carriage is arranged to work almost automatically, but to do this it is necessary that care should be taken of its different parts.

The oil should always be poured in when the piston-rod is within the cylinder; not less than 25 gallons should be used when firing with full-powder charges.

The piston-rod should be kept free from rust in order that it may move freely.

There should be as little play as possible between the pintle transom and key-pin holding it in place, in order to avoid bending the transom.

The pintle rollers and all the wheel and axle journals should be kept well lubricated.

The carriage should be "in battery" when not in use, that the piston-rod may not be exposed to the weather.

The prop screws should be given one-third of a turn before firing, just sufficient to clear them from the traverse circles.

As the loading crane operates best when the top carriage is 5 feet from the front buffers its position on the chassis should be observed.

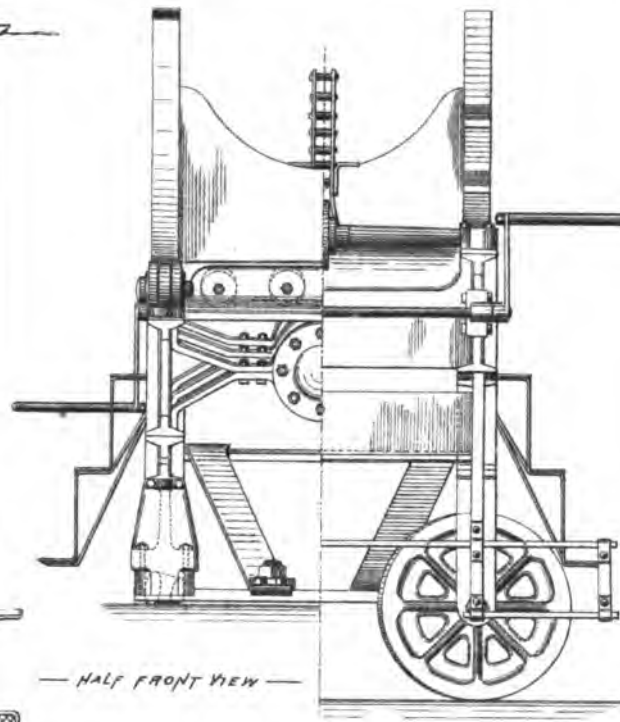
Range table.

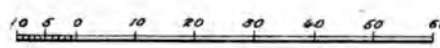
[Weight of shot, 455 pounds. Initial velocity, 1,706 feet. Powder charge, 130 pounds.]

Distance of object.	Angle of—				Remaining velocity.	Energy.	Penetration (unbacked wrought-iron).
	Elevation.		Fall.				
Yards.	*Deg.*	*Min.*	*Deg.*	*Min.*	*Feet.*	*Foot-tons.*	*Inches.*
* 0	.....	.....	.....	.....	.....	.....	.....
100	.....	.....	....	7	1,652	8,522	11.4
200	.....	3	....	14	1,600	7,994	11.1
300	.....	10	.....	21	1,550	7,502	10.7
400	.....	17	.....	28	1,507	7,092	10.4
500	.....	24	....	36	1,460	6,656	10.1
600	.....	31	.....	44	1,420	6,296	9.8
700	.....	40	.....	54	1,380	5,947	9.5
800	.....	49	1	5	1,340	5,607	9.2
900	.....	58	1	16	1,302	5,293	8.9
1,000	1	7	1	27	1,266	5,005	8.7
1,100	1	16	1	39	1,230	4,725	8.5
1,200	1	25	1	52	1,197	4,474	8.3
1,300	1	34	2	7	1,166	4,246	7.5
1,400	1	46	2	24	1,138	4,044	7.5
*1,500	1	54	2	41	1,111	3,853	7.6
1,600	2	00	2	53	1,083	3,663	7.5
1,700	2	13	3	5	1,055	3,476	7.3
1,800	2	26	3	36	1,032	3,326	7.1
1,900	2	40	3	57	1,010	3,185	6.9
2,000	2	54	4	18	989	3,054	6.8
2,100	3	8	4	42	970	2,938	6.6
2,200	3	22	5	6	950	2,818	6.5
2,300	3	36	5	30	930	2,713	6.4
2,400	3	50	5	55	915	2,614	6.3
2,500	4	4	6	20	895	2,501	6.2
2,600	4	18	6	47	882	2,429	6.1
2,700	4	32	7	14	865	2,336	6 0
2,800	4	46	7	42	851	2,262	5.9
2,900	5	00	8	12	836	2,182	5.8
3,000	5	14	8	48	822	2,110	5.7
3,100	5	31	9	24	807	2,033	5.6
3,200	5	48	10	3	795	1,973	5.5
3,300	6	5	10	43	783	1,914	5.4
3,400	6	22	11	27	771	1,857	5.3
3,500	6	42	12	11	758	1,794	5.2
3,600	7	2	12	55	747	1,742	5.1
3,700	7	24	13	39	734	1,681	5.1
3,800	7	49	14	23	725	1,641	5.0
3,900	8	14	15	7	714	1,592	4.9
4,000	8	39	15	51	704	1,546	4.8
4,100	9	4	16	36	696	1,512	4.75
4,200	9	29	17	22	687	1,474	4.7
4,300	9	54	18	9	678	1,436	4.7
4,400	10	19	18	57	670	1,402	4.65
4,500	10	44	19	45	661	1,365	4.55
4,600	11	14	20	33	653	1,330	4.5
4,700	11	44	21	22	645	1,290	4.45
4,800	12	14	22	9	637	1,267	4.39
4,900	12	44	22	59	629	1,236	4.27
5,000	13	14	23	49	622	1,207	4.22
5,100	13	44	24	39	615	1,180	4.2
5,200	14	14	25	36	608	1,153	4.19
5,300	14	44	26	33	601	1,126	4.14
5,400	15	16	27	36	594	1,102	4.04
5,500	15	49	28	43	588	1,079	4.03
5,600	16	23	29	50	581	1,054	4.00
5,700	16	58	31	7	575	1,032	3.97
5,800	17	33	33	24	569	1,011	3.92
5,900	18	8	34	44	563	989	3.88
6,000	18	46	36	17	557	969	3.8

* Energy and penetration on basis of 450 pounds weight of projectiles.

PLATE I.

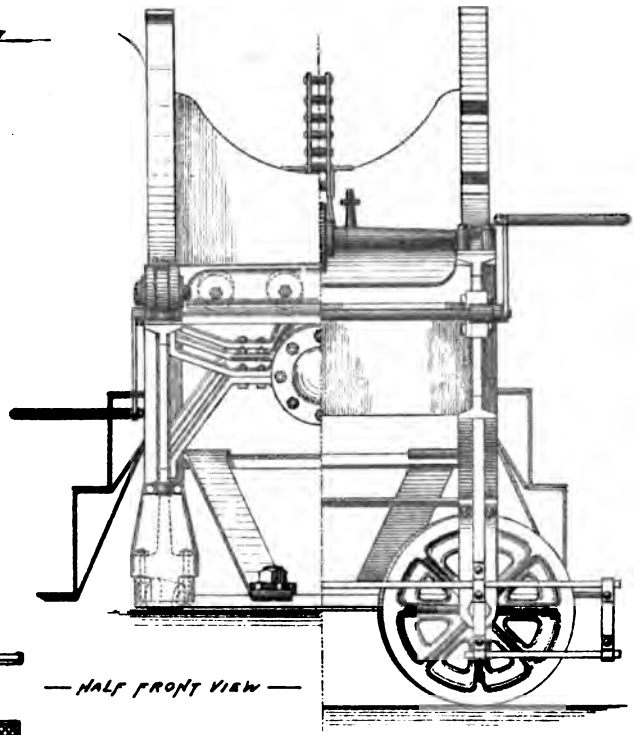


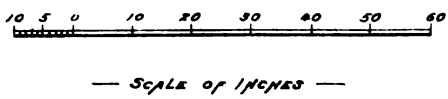


— SCALE OF INCHES —

Appendix 11—1888.

PLATE II.


— HALF FRONT VIEW —
— HALF REAR VIEW —


10 5 0 10 20 30 40 50 60
— SCALE OF INCHES —

APPENDIX 12.

INSPECTING GLASS FOR SPRINGFIELD RIFLES AND CARBINES.

(1 plate.)

Fig. 1 is a perspective view from the front and above. Fig. 2, a longitudinal section through receiver and through the instrument when in a forward position, with a side view of breech-block. Fig. 3, a cross section through the receiver at the ejector-stud, with the instrument in rear position.

A brass frame, B, shaped to fit in the receiver A, holds a mirror, M, by which the bore can be viewed from the rear, or which illumines the bore for observation from the muzzle.

Portions of the brass frame at *t*, *t*, *t* are turned down to hold the mirror against the inclined face of a wooden block, W, concealed within the frame to stiffen it and prevent the crushing of the glass. The mirror does not extend quite to the top.

When the instrument is set well forward it is held between the breech-block, resting on the bar *b*, and the ejector stud L, which supports the beveled face *l*.

A hole, H, in the bottom fits over the ejector-stud when the instrument is set well back, and the breech-block rests at *d* against the face *b*, holding the frame in place as before.

As at first designed, springs were to have been added to fit over the sides of the receiver and hold the frame in place, but this arrangement proved unnecessary. The springs are shown at S in Fig. 3.

This glass can also be used in inspecting the barrel of revolvers when the cylinder is removed.

A. H. RUSSELL,
Captain, Ord. Dept., U. S. A.

VANCOUVER BARRACKS ORDNANCE DEPOT,
March 30, 1886.

DIRECTIONS FOR USE.

This instrument is designed to facilitate the inspection of chambers and bores of Springfield rifles and carbines.

For this purpose, raise the breech-block, place the mirror in the receiver in such a position that the ejector-stud shall fit in the hole on the under side of the mirror-frame, or that the lower rear corner of the frame shall be immediately in front of the ejector-stud, as may be found most convenient.

To examine the chamber and rear portion of bore, cause the light to pass down the bore from the muzzle, and look at the mirror in a direction perpendicular to the axis of the piece.

To examine the front portion of the bore, cause the reflected light from the mirror to pass up the bore, and look down from the muzzle.

NATIONAL ARMORY.
Springfield, Mass., June 30, 1886.

INSPECTING GLASS
for Springfield Rifles and Carbines

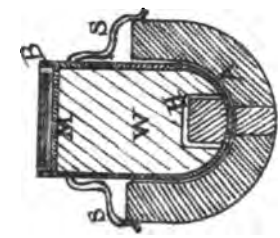


Fig. 3.

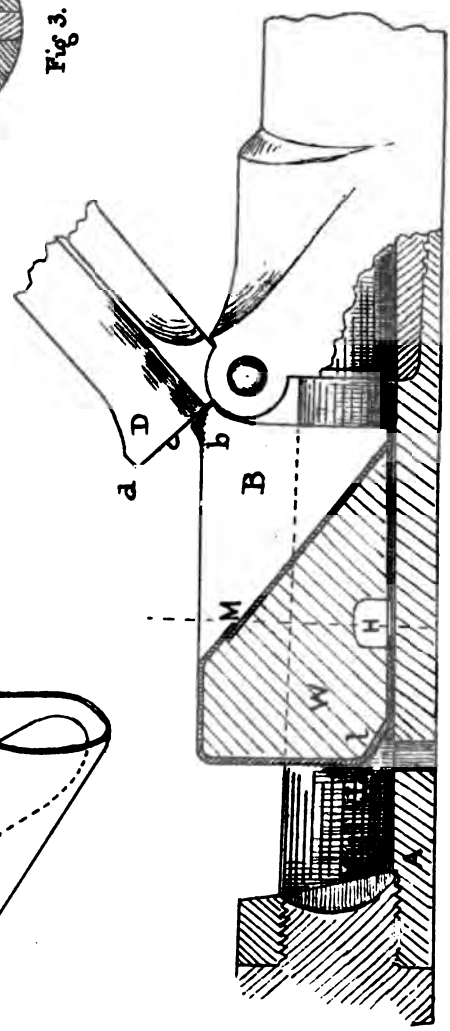
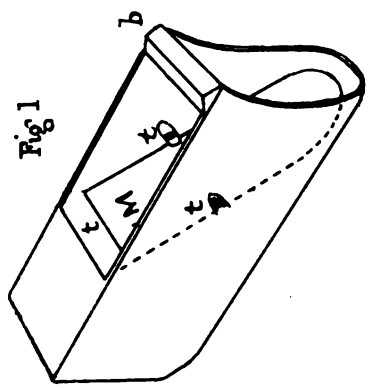


Fig. 2



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50TH CONGRESS, 2d Session. } HOUSE OF REPRESENTATIVES. { Ex. Doc. 1, Part 2.

REPORT

OF THE

SECRETARY OF WAR;

BEING PART OF

THE MESSAGE AND DOCUMENTS

COMMUNICATED TO THE

TWO HOUSES OF CONGRESS

AT THE

BEGINNING OF THE SECOND SESSION OF THE FIFTIETH CONGRESS.

IN FOUR VOLUMES.

VOLUME IV.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1888.

LETTER OF TRANSMITTAL

SIGNAL OFFICE, WAR DEPARTMENT,
Washington City, October 10, 1888.

SIR: I have the honor to submit herewith the Annual Report of the Chief Signal Officer for the year ending June 30, 1888, and in compliance with War Department circulars of August 12 and November 13, 1886, I certify that all the matter contained in this annual report and the appendices submitted therewith is necessary and relates entirely to the transaction of public business of this Bureau, and that the publication of the same is necessary for the good of the service, and will greatly improve as well as facilitate the performance of current work.

I am, very respectfully, your obedient servant,

A. W. GREELY,
Chief Signal Officer.

The Hon. SECRETARY OF WAR.

REPORT OF THE CHIEF SIGNAL OFFICER.

SIGNAL OFFICE, WAR DEPARTMENT,
Washington City, October 8, 1888.

The Honorable the SECRETARY OF WAR.

SIR: I have the honor to submit for the fiscal year ending June 30, 1888, the regular annual report of the operations of the Signal Corps.

The changes in the personnel of the Corps and in the organization of the central office have been important. The death of 2d Lieut. Leroy E. Sebree, on January 29, 1888, leaves the number of second lieutenants at fourteen, while the reorganization of the force at the office of the Chief Signal Officer has reduced the number of enlisted men from 470 to 320. For the first time in the history of the Corps, the civilian assistants, who have performed for years valuable scientific work under the disadvantages of temporary and uncertain tenure of office, are now recognized as professors and assistant professors and form a part of the regular office force.

The reduction of clerical force, diminution of expenses, the obtaining of better quarters, and an improvement in the character of the indication work and signals, as compared with that of the previous year, cover the most important details of the Service.

DIVISION OF MILITARY SIGNALING.

The report of this division by 1st Lieutenant R. E. Thompson, 6th Infantry, Acting Signal Officer, who has been in charge of the division during the year, forms Appendix No. 1. Lieutenant Thompson has carried out, with great interest and zeal, his instructions to familiarize himself fully with foreign organizations and appliances, in order that this office might be fully informed of all modern improvements which bear upon the best methods of maintaining field communication between separated army corps. Lieutenant Thompson's elaborate report contains valuable data of more than transient interest, which will well repay careful consideration by all those interested in military signaling.

In it will be found an excellent sketch of the organizations for military signaling in the civilized armies of the world, and also interesting and important information and suggestions concerning the use of heliographs, the equipment of rifle-ranges, and the practical operations of field-telegraph lines under conditions of active service.

The Chief Signal Officer has carried out, as far as insufficient appropriations and limited means at his disposal would permit, the provi-

sions of law which impose upon him the charge of the general Signal Service of the Army and the equipment and management of telegraph lines constructed for strictly military purposes. He would be neglectful of his duties if he did not urge upon his official superiors the unsatisfactory and inefficient conditions which must necessarily arise whenever any grave emergency necessitates the management and use of the electric field telegraph train or the perfection of any important or extended signal operations.

Improvements in the equipment, battery material, instruments, &c., of field telegraph trains, experiments with portable field telephones, and other desirable mechanical devices, have of necessity been dispensed with for lack of means and facilities. A few experiments, with a view to improving the flag, kits, torches, and lanterns, are yet in progress, but they are strictly limited for the reasons above given.

The elaborate organizations of the important military powers in Europe show that the important function which the telegraph plays in war is fully appreciated abroad. The United States first used the field-train in action, and American ingenuity and enterprise thus put in practical form the idea of constant and instant communication between the main bodies of the army and its commanding general. The signal and telegraph organizations of the various nations are almost exclusively military. The few nations which favored the performance of telegraph work by civilians have realized the necessity of the telegraph service being a function of the army, and in every nation except France steps have been taken to attain this end, and even in France late information indicates that field telegraph service is now considered a strictly military duty, as schools for instruction of officers and enlisted men in these duties have been established.

The requirements of signaling in connection with military operations in our western territories have been such as to tax the powers and ingenuity of modern invention, and not only has the heliograph become a necessity for field campaigning in connection with Indian outbreaks, but the demands have been for methods of greater certainty and available for greater distances than obtained with the pattern of instruments now in use. In view of the importance of the instrument, and impressed with the necessity of theory and practice going hand-in-hand, the Chief Signal Officer requested the organization of a board which should examine all known instruments, and in case none was thought to be practically perfect, should devise a standard heliograph. The Chief Signal Officer pointed out in his last annual report that such an instrument should be capable of satisfying the various and difficult requirements imposed by the nature of our Army service, and that its mechanical construction should be such that repairs for instruments rendered unserviceable by the vicissitudes of a campaign could be made with certainty and ease. This result could be only secured by following the modern scientific practice in vogue among our great manu-

facturers, of making all like parts of the heliograph by machinery, and to such a degree of perfection as to be interchangeable.

The officer selected as president of this board was Captain F. C. Grugan, 2d Artillery, who was qualified for the duty by his field experience in cavalry, as well as by his researches in former years, when his inventive genius had been exercised in the interests of signaling. The other members were 1st Lieutenant M. P. Maus, 1st Infantry, whose extensive and successful signal work in the field with different heliographs particularly fitted him for this work, and 2d Lieutenant Frank Greene, who was familiar with the methods of field instruments previously used in the Signal Service.

The board reported that no instrument extant suited the widely-varying needs of our military service, and so decided to construct an instrument which should be simple, of few and interchangeable parts, reasonable in weight, with good-sized mirrors, stable when in use, capable of accurate sighting and adjustment, with a separate screen, and on the fixed-flash system. The instrument devised, models of which have been constructed, has been tested with most satisfactory results, under varying atmospheric conditions, up to a distance of thirty-five miles, and it is believed that in the clear western atmosphere this heliograph can be used with the naked eye a distance of fifty or sixty miles. The heliograph has been so constructed and packed, with its division into two packages weighing respectively 6¼ and 7⅝ pounds, that its safe portability under almost any circumstances is beyond question.

Unusual attention has been paid to the selection of field glasses for Army use. The questions of portability, strength of power, and range of field, have been given careful consideration in order that the small number of glasses which this Service is able to purchase may be suited to general use. The conclusion has been reached that possibly in future instruments a simple adjustment can be arranged so as to readily change power and field, and make the glass serve equally well for differing conditions of light and range.

The examination of a large number of glasses, thirty-eight different instruments, makes it evident that the distance between the eyes of the average American is somewhat less than that of the European, as appears from the pupillary distance of the foreign glass. This difference has also been noted by officers of the United States Naval Observatory, who now in their specifications for field-glasses require the insertion of a joint in the glass so that the coincidence of the centres of the lens and the eyes is made solely dependent on the adjustment.

The conditions of environment which have made homing pigeons so valuable in the past to France fortunately do not exist in connection with the United States, but the Chief Signal Officer felt that he would be derelict towards his Corps had he neglected to experiment with a means of communication which has commended itself to Germany,

France, Russia, Italy, and other countries, and for which large sums of money are annually voted abroad.

Experiments have been made, from Key West as a basis, during the year with homing pigeons. The liberality of prominent bird fanciers of the country and the courtesy of the Quartermaster-General in granting the occupation of an unused storehouse at Key West Barracks has permitted these experiments to be made at a minimum of expense to this Service. Fifty-six pigeons of approved strain have been donated to the Government, all of which were sent to Key West. After the receipt of a number of these birds training was begun from the seaward as well as on land. The latest reports show that nine pigeons can be relied upon for distances of 100 miles over water, five more for distances of 60 miles, while the remaining birds have been trained at distances not exceeding 60 miles. This is excellent work for birds ranging in age from one to four months.

The Chief Signal Officer again invites attention to the inadequacy of present methods to insure proper instruction in military signaling at Army posts. The plan of appointing post signal officers, with orders to practice military signaling until the garrison is qualified, has been fostered faithfully by this office, but the results cannot be considered satisfactory. Although reports received indicate, theoretically, that a portion of the Army is competent to perform military signaling, yet experience has shown that such is not actually the fact.

The records show that less than one officer out of nine of the line of the Army has received any instruction in signaling during the year; less than one in twenty-seven one hour's instruction monthly, even in the most elementary branches. Over one-fourth of the officers instructed had no field practice, and less than one-eighth of the whole had night practice, while only six officers of the Army out of one hundred and forty-one instructed have been drilled with flag, torch, and heliograph. Out of one hundred and fourteen posts, eighty-four have neglected instruction one or more months; twenty, six or more months; and at four posts no instruction has been had during the year. There are no less than ten regiments in which no officer has received instruction during the year, nine other regiments in which one officer, only, has been instructed, and four regiments in which two have been instructed. It thus appears that in one-quarter of the regiments of the Army no instruction has taken place, and in one-half practically none. General interest in signaling was manifested in but four regiments: the 1st Artillery, 6th Cavalry, 4th and 20th Infantry.

It is evident from the records that instead of the Army being properly and efficiently drilled in military signaling, there is not an average of two officers to a regiment who are competent to transmit signals—by sun, flag, and torch—day and night, except those who have passed through a regular course of instruction in connection with this office.

The Chief Signal Officer has pointed out how indifferently this sys-

tem of dependence on the line of the Army for officers and signal men operates in time of peace, and has forecast that such a course simply indicates the practical abolishment of this Corps for any future war, since an efficient force for signaling could not be instantly created.

Lack of appropriations has forbidden experiments in such directions as to increase the efficiency of the military branch of the Signal Corps, and the same cause has prevented the purchase of such important signal supplies as rockets, signal-bombs, colored lights, &c. The portable signal tower and the valuable field telegraph trains, which cost many thousands of dollars, have suffered from exposure to the weather, and are now only under shelter under such conditions as preclude their being kept in serviceable condition or available for practice drills. In short, only such signal equipments and supplies as are absolutely indispensable for current military use have been purchased. Requisitions for signal equipments and stores of a money value of ten thousand dollars are on file in this office, which cannot be filled. The Chief Signal Officer has followed the rule outlined in his last annual report, supplying military posts to the westward of the Mississippi River rather than those to the eastward, since field service in connection with which signal work is performed is to be expected in the territories rather than along the coast.

The proper fitting out of the rifle ranges, with electrical applicances necessary for convenient and proper rifle practice, devolves upon the military branch of this Service. Insufficient means have prevented a proper equipment of many rifle ranges. No possible pains have been spared, on the part of the Chief Signal Officer or his subordinates, to piece out by strict economy and careful foresight the insufficient appropriations for this purpose. The necessity for electrical appliances on target ranges should be apparent to all, as no year passes without death or serious wounds occurring, through lack of proper appliances for communication between butts and the firing range. With the strictest economy it will be impossible to properly equip the Army with signal equipments and stores, and fit out the target ranges with suitable electrical appliances, without an annual appropriation of not less than $7,500, which is strongly urged.

The Chief Signal Officer recommends the detail of an officer of the Signal Corps with a small number (four or six) of men, as instructor at the great schools of the Army, at Fort Leavenworth, Fort Monroe, and Fort Riley. One officer of the Signal Corps would be sufficient to give this instruction, as he could be quartered at the school where the largest number of officers were stationed, and could perform his duties of instruction at the other schools at such periods of the year as would least interfere with special studies. In order to test the efficiency of officers at large an officer of the Signal Corps should visit, from time to time, the larger posts of the Army for the purpose of inspection and examination, as to the condition and efficiency of signaling.

The officers of the Signal Corps themselves are now deprived of all means of regular instruction and drill and will soon become unfitted for practical work under difficult conditions. A few years since the Signal Corps of our Army was the most efficient in the world, but now, while foreign governments, impressed with the importance of such service, increase and improve means of signaling, this Service must steadily retrograde unless suitable means of practice are provided.

METEOROLOGICAL WORK.

The duties of a civil character which devolve by law on the Chief Signal Officer of the Army, under the supervision of the Honorable Secretary of War, have naturally engrossed the greater part of the time and energies of the officers and men of the Signal Corps.

WEATHER FORECASTS, COLD-WAVE AND STORM WARNINGS.

The usual forecasts, cold-wave and storm warnings, have been issued regularly, and, as in previous years, the continuity and efficiency of the telegraphic service, rendered by the Western Union Telegraph Company, has been such as to elicit general commendation. The only interruption to this regularity occurred during the severe storm of March 11, 1888, when the great cities along the New England and middle Atlantic coasts were unable to promptly transmit their reports.

The growing urgency of demands upon the central office for weather forecasts proves most conclusively the confidence placed by the general public in the accuracy of these predictions, despite errors arising partly from incorrect general forecasts and partly from the variety of weather conditions which prevail in the large areas predicted for.

Although such a course entails greater labor upon this Service and demands a higher order of talent in the predicting officer, yet the Service has adhered to the plan of limiting predictions to states. Whenever the division of a state is advisable it has been based on such physical configurations as have a marked influence upon weather conditions. The applications for special predictions for cities and towns have been so numerous that this office could not undertake to furnish them regularly, as such action would necessarily end in the predictions for the general public being slighted and neglected in the interests of those for special sections. The office has always furnished such special and local predictions as could be issued without overtaxing the indications official.

The necessity of local predictions has been met to a very marked extent in New York by the enterprise of the "New York Herald" and the "New York Tribune," and in Cincinnati by the "Commercial-Gazette." These papers, having meteorological editors of ability and energy, have been able to supplement the general predictions of this Service with local predictions, which have undoubtedly been of great

value to the country adjacent to those cities. It is to be regretted that the Blue Hill Observatory, near Boston, which formerly furnished supplementary predictions for southeastern Massachusetts, through the enterprise of Mr. Lawrence Rotch, has discontinued this valuable work. Other great journals, such as the "Boston Herald," "San Francisco Chronicle," and the "Galveston News," have contributed largely of their time and space in order to place in a clear and simple manner before their readers such climatological and meteorological data as were of local interest. The value of such hearty co-operation by the press of the country cannot be overestimated, as they have millions of readers who never see Signal Service data or charts in other forms.

The tri-daily indications for the fiscal year were issued for a period of thirty-two hours, so that they held good for more than twenty-four hours after reaching the general public. The increased length of hours in the predictions was initiated in the public interests, and it necessarily resulted in a reduced percentage of verifications, which has been found to be 7 per centum. Although the Chief Signal Officer believes that with carefully-selected and experienced indications officers, the predictions for thirty-two hours could be substantially improved, yet he has yielded to the generally-expressed sentiment that the number of predictions should be reduced so as to avoid uncertainty and complication, and that they should be for a briefer period. In consequence, they are now made as of old, for twenty-four hours.

With a view of making the examination of the indications as to their accuracy, as comparable and impartial as possible, this work has been entirely intrusted to Assistant Professor Charles F. Marvin, whose report forms Appendix No. 2. Since this gentleman does not make predictions himself, his mind and judgment are free from any bias, and other officials who make the predictions feel that their work will be viewed with the utmost care and impartiality. The Chief Signal Officer finds that the officers who do the predicting work of this Service agree with him in believing that such a course is for the interest of the Service, as the practice of a small circle of interested officers verifying the accuracy of work which must affect their personal standing is not calculated to benefit the public service, or to insure that public confidence which the high standing of the officials merits.

The percentages of successful indications for the year ending June 30, 1888, are set forth in detail in Appendix No. 2. The general percentages have been: for weather, 78.9; wind, 75.5; temperature, 74.2; a general average of 76.7. It should be understood that in determining the general average the weather is given the weight of 5, temperature 4, and the wind of 1; a method inaugurated by my predecessor. In determining their weight, these elements have been considered with reference to the importance laid upon them by the general public. For comparative purposes there should be added 7 per centum to these figures, it having been satisfactorily determined such decrease in ac-

curacy resulted from the extension of the period of prediction from twenty-four to thirty-three hours, which would give, in comparison with standards and records prior to 1887, a percentage of 83.7. It is gratifying to report that the accuracy of these predictions has improved 2.7 per centum during the year.

With the view of giving each official of this Service full credit for the character of the work done by him, the Chief Signal Officer has continued to publish in the Monthly Weather Review the name of the officer making the Indications, and also the percentages of successful work as regards the prediction of the weather, and the display of storm signals and cold-wave warnings. In Appendix No. 2 will be found a summary of the work for the year, wherein appears the relative standing of each official in each branch of this difficult work.

STORM SIGNALS.

During the current year there have been 1210 storm signals of all kinds ordered, of which 936, or 77.4 per cent. have been verified. This percentage is 8.9 higher than in 1887, and while this improvement is noted with satisfaction, it is believed that more accurate work is possible. The detailed table of signals is in Appendix No. 2.

Until the present year this Service has never attempted to predict the force of storms, although such duties are plainly imposed upon it by Joint Resolution of February 9, 1870, under which the Service was organized. The difference in the force of storms is so great and of such importance to the maritime public that a system for this purpose was inaugurated and put in force on September 1, 1887. The signals displayed indicate whether a storm is to be light or severe, and whether the storm-centre is approaching or has passed the station, and, finally, from what quarter the winds are expected. The Service attempts, however, only to predict easterly winds or westerly winds, since a very slight change in the course of a storm makes a wind northeast instead of southeast. In order that the general public may have the benefit of an opinion, which does not rise to the dignity of a prediction, the indications official in all cases indicates whether the strong winds are expected in the northerly quadrants or southerly quadrants.

The publications of this Service clearly set forth that this distinction of quadrants must not be relied upon, but that parties can only count on easterly or westerly winds, as the case may be. In separating winds into easterly or westerly winds, the southerly wind is classed with the easterly winds which occur in the United States in advance of the storms, and the northerly winds with the westerly, because it occurs, as a rule, after the storm-centre has passed.

The display of this class of signals, giving such definite information, has proved advantageous and most satisfactory to the maritime interests of the country. Under the old system, westerly and other off-

shore winds favorable to navigation, were frequently the cause of unjustifiable alarm owing to the signals displayed in connection with them. Under the prestent system, when signals are displayed for off-shore winds, the fact is clear to every one, and such signals instead of being based on moderate westerly winds, as formerly, are now only shown when those winds are expected to attain such force as to be dangerous to illy-provided vessels.

PACIFIC COAST.

2d Lieutenant J. E. Maxfield, Signal Corps, has performed the important duty of making weather forecasts for the Pacific coast, which have been issued twice daily, at noon and 8 p. m., except from July 28, 1888, to September 14, 1888, when that officer was absent inspecting the stations of the Service. The good results of continued practice is shown by the decided improvement in the predictions over last year, and Lieutenant Maxfield is to be complimented on this successful work, which is 3.1 per centum higher than that of 1887. See Appendix No. 3. The percentage of success in forecasting has been as follows: Weather, 87.5; wind, 77.7; temperature, 75.2; general, 81.6.

The display of signals has been continued with satisfactory results. Storms upon the Pacific coast are rare, yet severe, and coming, as they do, from the ocean, the difficulty of early warnings is materially increased. The injury to the cable at Tatoosh Island and the continued interruption of that in Columbia River have materially interfered with the display of storm warnings, since these cables reach points at which warnings of coming storms are most valuable.

During the year Mr. M. H. De Young, proprietor of the "San Francisco Chronicle," at a very considerable expense, contributed materially to the improvement of the Service in California by the establishment of nine observing stations, viz., Yreka, Mendocino City, Modesto, San Luis Obispo, Bakersfield, San Bernardino, Santa Rosa, Indio, Cal., and Carson City, Nev., from which reports were regularly received, and also by the distribution of daily forecasts to points not speedily reached by the metropolitan press. This service was continued at the expense of Mr. De Young through the wet season, and was received with great favor by agricultural communities.

The appropriations for telegraphing for the present year are sufficiently liberal to permit the telegraphic distribution in California to be continued by this Service, but on a somewhat smaller scale, and such orders have been issued as will insure the distribution of indications in the raisin-drying districts of California at the period of the earliest rains, which, without such warnings, are liable to do a vast amount of damage in a few hours to the half-cured grapes. During the wet season the daily indications for the benefit of the general agricultural community will be made very full and distributed at the expense of this Service, so as to meet the needs of agriculturists.

The Southern Pacific Railway Company has contributed largely during the present, as in past, years to the knowledge of meteorological conditions which obtain at its railway stations. Without such liberal action on the part of that corporation, the present knowledge of rainfall and temperature conditions throughout California, Arizona, Nevada, and northern California would be scanty and unsatisfactory.

COLD WAVES.

The system of cold-wave warnings has continued in successful operation, to the general satisfaction and frequently great advantage of the public. It is now generally understood that the exact meaning of the term "cold wave," implies that the temperature will fall below forty-five (45) degrees, and that in twenty-four hours an abnormal fall of fifteen, or more, degrees will occur. The great advantages of knowing sixteen to twenty-four hours in advance that the temperature will fall quickly, apply not only to manifold business interests, but affect the comfort of thousands, and at times the health and life of hundreds. The importance of early and successful forecasts of cold waves is the greatest in the Northwest. In order to meet the needs of that section, and to comply with the earnest applications from citizens, and corporate bodies of great vested values, the Chief Signal Officer stationed an indications officer, 1st Lieutenant Thomas M. Woodruff, 5th Infantry, Acting Signal Officer, at Saint Paul, Minnesota.

This arrangement enabled that officer to receive his reports an hour earlier than in Washington, and further enabled him to send out warnings of cold waves from two to five hours earlier than was before done. A warning earlier by two or three hours, while not of special importance east of the Mississippi River, is very much so to the Northwest, where the earliest signs of a cold wave are rarely more than twelve hours in advance of its full predominance.

This action of the Chief Signal Officer resulted in a marked improvement of cold-wave warnings for Dakota, Iowa, Minnesota, Nebraska, and Wisconsin; so that the percentage of signals ordered by Lieutenant Woodruff was considerably greater than those for 1887.

The relief of this officer from duty with the Signal Service has necessitated a change, and during the coming year the cold-wave signals will be ordered from the central office. With a view, however, to improving the character of cold-wave predictions, the Chief Signal Officer has directed the study of this phenomenon by Assistant Professor Thomas Russell, whose assignment to this work will follow some time during the coming year. It is hoped that the permanent assignment of but one officer to issue this important class of warnings will result in a very material improvement of that branch of the Service.

The number of cold-wave signals displayed during the year has been 1,743, of which 1,240, or 71.5 per cent. were verified. Many other sig-

nals, not marked as successful, were followed by abnormal falls of temperature of from 10° to 14°.

In connection with cold-wave warnings, the percentages in the past have not taken into account the number of cold waves which have advanced unannounced by this Service, but the rules now adopted will affect the percentage of verifications whenever an official fails to predict. The necessity of this rule in the public interest is obvious, since the method which has hitherto obtained encourages officers to neglect warnings in doubtful cases, and thus obtain a high percentage of success by confining their predictions to well-marked cases.

WEATHER SIGNALS.

About eleven hundred cities and towns are furnished with the daily weather indications by telegraph, at the expense of this Service. This demonstrates the interest taken, and the value placed upon, the weather reports of the Service, since the flags and means for displaying the signals are invariably at private expense. Every effort has been made to confine the distribution of these signals to such towns and villages as cannot be promptly supplied with this information through the press.

WEATHER-CROP BULLETIN.

This office has continued the issue each Sunday morning of a bulletin showing the effect of the weather, for the previous seven days, on important crops, especially cotton, corn, hay, tobacco, and wheat. Many commendatory letters have been received attesting the great practical value of such a system of weather bulletins, which shows the excess and deficiency of sunshine, temperature, and rainfall for short regular periods. Such information is an important factor in determining in advance the probable yield of the great staples of the country, and so has a marked bearing on all extended enterprises.

SPECIAL BULLETIN.

Special bulletins have been issued when needful, to give warnings of approaching frosts, severe and sudden falls of temperature, dangerous floods, and the probable movement of dangerous storms.

ELECTRICAL OBSERVATIONS.

Observations on atmospheric electricity, with a view to determining its relation to weather conditions, and whether such observations of electrical phenomena would further weather predictions, have been continued throughout the year at four stations: Boston, Mass.; Washington, D. C.; Ithaca, N. Y., and Terre Haute, Ind. The Chief Signal Officer has been fortunate to secure, for a nominal consideration, the very valuable services of Professor T. C. Mendenhall, Presi-

dent of the Rose Polytechnic Institute, Terre Haute, Ind. The great personal interest which Professor Mendehall has taken in these observations, and the careful scientific discussion which they are sure to receive at his hands, will, it is believed, have valuable results, even though they be of a negative rather than a positive character.

THE WEATHER REVIEW AND INTERNATIONAL BULLETIN.

The Weather Review and the Summary of International Meteorology have been published monthly in connection with the current work of this Service, and, besides being economical methods of preserving the data collated by this Service in a suitable form for study and reference in connection with the current work of predictions, have proved valuable and interesting to voluntary observers and other meteorologists. Over one thousand meteorological reports have been received and used monthly in connection with the United States Monthly Weather Review. Additional reports from nearly four hundred land stations have been collated for the International Summary, together with reports from over seven hundred vessels. The reduction of appropriations for printing, and restrictive legislation, have prevented, much to the regret of the Chief Signal Officer, this office from publishing the full data of this valuable and unparalleled set of observations, as promised by his predecessor (General Myer) to international co-operating observers at the Vienna Meteorological Conference.

In order to profit as fully as possible from the ten years' observations, the Chief Signal Officer has decided to prepare monthly maps of the mean pressure, mean temperature, prevailing winds, and average storm tracks for each month of the year. The preparation of these charts serves as a valuable study to those engaged on this work, and it is certain that the knowledge gained from a study of the movements of the storm-tracks over the whole northern hemisphere, and the movements of the atmosphere from month to month, will be productive of beneficial results as regards the ordinary work of this Service. It is only by discussions of the monthly means for prolonged periods of time, and over extensive areas of the earth's surface, that the world can hope to arrive at long-time predictions, and the appearance of these pressure charts will be looked forward to with considerable interest, as strengthening or weakening the theory that the movements of high areas of pressure by months are shown to have a regular progressive march over the whole northern hemisphere.

In connection with the preparation of these charts, this office has outlined very clearly on the North Atlantic the limits of ice dangerous to navigation. The examination of the ice charts enables the navigator to determine with considerable accuracy the approximate path of safety during the months when icebergs and ice-fields most prevail. The discovery that the dense fogs of Newfoundland bear a definite

relation to the storm-centres which pass from New England and the Saint Lawrence Valley eastward over the Atlantic Ocean, renders it possible to predict, with very considerable accuracy, several days in advance, the coming of these fogs. Steamships leaving American or European ports are now being warned by the "New York Herald" of the weather to be expected near the American coast, so that in case of fog or ice they may pass southward and thus avoid delay and danger.

On January 1, 1888, the Chief Signal Officer discontinued the collation of marine observations, believing that the operations of this Bureau were a duplication of the work pertaining to the Hydrographic Office of the United States Navy. That valuable department of the Navy has regularly, promptly, and systematically furnished this Bureau with all important weather observations which have come into its possession, and the two departments work in perfect harmony and accord.

The report of the officer in charge forms Appendix No. 4.

RAILWAY BULLETINS.

The railway bulletin service has decreased during the year; its work is being substantially replaced by the labors of the various state weather services and the plan of co-operation adopted by the Chief Signal Officer with reference to them. Several railways continue the service, and it proves a rapid and generally satisfactory means of disseminating the indications. This office continues to furnish indications, and forms for display, to any railway which desires to co-operate with this Bureau. As the service is voluntary it is often the case that operators neglect to post the bulletins with that regularity which the important character of the work demands.

FOREIGN WEATHER SERVICES.

The Chief Signal Officer has faithfully carried out the arrangements authorized by the Honorable Secretary of War, which assured Professor Mascart, director of the Central Meteorological Office of Paris, that France and England should have the hearty co-operation of the United States Signal Service in the transmission of such weather dispatches as would benefit the meteorological services of those countries. Through the gratuitous co-operation of the captains of the great trans-Atlantic steamships this Service obtains regularly accurate reports of the weather conditions prevailing over the great storm regions of the north Atlantic. A cablegram is sent each night to Professor Mascart, at Paris, summarizing the synchronous observations, gales, derelicts, and dangerous ice of the Atlantic for the previous five days, and the weather conditions of the United States on the day in question.

This information is appreciated by the Meteorological Office of Paris, and shipmasters of all nations express the greatest satisfaction at the successful efforts of this Service in promptly collating and publishing

detailed information as to fog, ice-fields, and wrecks, since such information enables them to shape their westward course from England and France with greater safety. This information is telegraphed at the expense of the French government; but in view of the hearty and generous co-operation which the European nations have always extended in any scientific matters of interest or value to the United States, it is again recommended that the attention of Congress be called to the propriety of authorizing this service. This information is not of value to foreign governments alone, since the forecasts based on these reports, made in London and Paris, are considered of sufficient importance and value to be telegraphed in full to the "New York Herald," by which newspaper they are published for the benefit of mariners in general. The data for this work is daily collated at New York and forwarded to this office through the courtesy of the Chief Hydrographer of the Navy, whose active and hearty co-operation in furthering this meteorological work merits proper acknowledgment.

STATE WEATHER SERVICES.

The carefully prepared and interesting report of 1st Lieutenant H. H. C. Dunwoody, 4th Artillery, Acting Signal Officer, on the State Weather Services, forms Appendix No. 5.

Lieutenant Dunwoody has labored with great zeal in the interests of State Weather Services, and during the past four years has had charge of such measures of co-operation as have been possible on the part of the National Service towards these meteorological societies. During the year new services have been organized in New York, Texas, and Kentucky, which it is believed will be of practical value to the states in question. Including the New England Meteorological Society as covering the six states comprised within its territory, there have been organizations in twenty-nine separate states which have co-operated with the National Service during the past year. These organizations have been fostered by various scientific societies, and in many instances have been organized under a state law and wholly, or in part, maintained by appropriations from the respective states. In other cases, as in Texas and Oregon, the associations have been under the auspices of public-spirited exchanges or boards of trade which are interested in extending a knowledge of the climatic and meteorological conditions of their sections.

The Chief Signal Officer has pursued towards these services a policy of hearty co-operation, which has been limited only by appropriations and requirements of law. He has refrained from interfering with or criticizing the methods pursued by these associations, believing that the high order of ability and the scientific standing of the officers in charge enable them to administer the policy and affairs of their own organizations in a far more satisfactory manner than could be done

by any chief of the National Service, no matter how familiar he may be with the scientific work of the state services. The Chief Signal Officer has always furthered as far as possible any scientific investigation or work connected with meteorology under such auspices, and he believes that working as the state and National services do on separate, though converging, lines of research, that the mutual effect can only be of a stimulating and improving character.

An important illustration of the benefits from a state service is that of the weather service of Michigan, where Dr. H. B. Baker, Secretary of the State Board of Health, has been most successful in his investigations of the bearing of climatic changes and atmospheric conditions upon the prevalence of special diseases.

Lieutenant Dunwoody's report sets forth in detail the names of the directors of the state services and the Signal Service assistants, as well as many items of interest in connection with these important organizations. It is believed that if the Kentucky service had been thoroughly organized this year, the distribution of recent frost warnings sent by this office to Louisville would have been made in sufficient time to enable the tobacco growers to have saved considerable of their crops which were destroyed through lack of systematic warnings.

Several state services have started a weather-crop bulletin, based on the National bulletin initiated by the Chief Signal Officer in 1887. These publications have been received with great satisfaction, and have proved of material benefit to agricultural interests.

RIVERS AND FLOODS.

The question of river observations, in relation to dangerous floods and the stages of navigation, has engaged the earnest attention of the Chief Signal Officer. The disastrous floods of the past few years have emphasized the importance of careful and systematic river observations, and have shown the necessity of stations on all important tributaries of our great rivers. A properly arranged system of river and rainfall stations would enable a practiced indications official to predict many days in advance, with considerable certainty, the extent and continuance of any great flood, so that timely warnings would afford ample opportunity for such precautions as would mitigate the severity of such disasters.

The changes in river stations during the year are shown in detail in Appendix No. 6. At present seventy-eight special river stations, with paid civilian observers, are in operation. All the important river-gauges have been placed in complete order, their zeros carefully redetermined, and every precaution taken to insure the greatest possible accuracy of observations.

A system of rainfall stations was instituted July 1, 1887. These have been carefully located at suitable points in the great water-sheds

of the country, near the sources of the principal tributaries of our large rivers. The observers at these stations are paid a nominal sum, ten cents, daily, for their reports, which are mailed weekly to designated centres, and in case of heavy and excessive rainfall this information is forwarded, by telegraph, to a designated Signal Service station, in order that the information may be promptly disseminated throughout the section of country liable to be affected by the rainfall.

While the present appropriation for this important service can be made to cover the absolutely essential points throughout the year, yet another thousand dollars would insure greater perfection by enabling this Service to extend, at certain important stations, its observations beyond the flood season of the year to which they are now limited.

COTTON-REGION REPORTS.

The observations at special stations in the cotton-region have been continued as usual. The Chief Signal Officer has been persistently urged to increase the number of these; a course which would doubtless benefit the cotton interests, but which is impracticable. No further extension of this service is possible unless more liberal provision is made by Congress for these special observations. The amount allowed has been spent most economically, the remuneration paid to the observer being only twenty cents per day. One hundred and sixteen special cotton-region stations were in operation during the season.

DISPLAY STATIONS.

In addition to the regular stations for storm signals there are now in operation sixty-eight special stations. The whole system of special display stations has been carefully examined and revised and such changes have been made as public interests have required.

INSPECTION OF STATIONS.

Every office of the Service has been inspected during the fiscal year, except a few stations opened late in the year or those to which an inspector was en route in June last. The necessity of careful inspection of every meteorological station at least once a year is obvious, since in no other manner can the chief of this Service be assured of the continued accuracy of the instruments, the personal standing of the observers, and as to whether the observations and work of the Service are made and conducted by proper methods and manners. The observers of this Service are, in general, men of excellent character and high personal standing, whose business methods and personal deportment are satisfactory to the general public and to the chief of this Service, but unfortunately a number of men occasionally fall into such gross neglects of duty and behavior as affects the local standing of the Service and impairs its general efficiency. The visits of Inspectors

also serve to maintain among observers a uniformity of proper methods, an essential point in meteorological observations.

In addition to reporting carefully upon the standing of the observer and his methods of performing public business, the Inspector is also further required to confer with all such committees and business firms as from the character of their enterprises and from their general standing are believed to be especially interested in this Service. It is only by consulting local interests that the sphere of usefulness of this Service can be increased, and not only has the present Chief Signal Officer invited suggestions from one and all, but he has always given them careful personal consideration, so that such as were in the interest of the general public might be adopted.

The Inspectors concur in reporting that the total absence of any course of instruction seriously embarrasses observers when new assistants, without practical or theoretical knowledge of meteorological work, are sent to them for duty.

Appendix No. 7 shows the date, and by whom, the various stations were inspected.

UNITED STATES TELEGRAPH LINES.

The Telegraph Division, for the convenience of administration, was during the present fiscal year under the orders of 2d Lieutenant F. R. Day, who also had charge of the Stations Division. A separate report on telegraph matters forms Appendix No. 8.

The telegraph room of the central office has been conducted with the same efficiency as has characterized it in past years, and all work has been most satisfactorily and promptly done. In addition to the receipt of more than a million words of cipher reports, and the transmission of about eighty thousand service telegrams, the men of this room have also been charged with auditing the large and intricate telegraph bills connected with the work of this Service.

Judging from the grave misstatements publicly made, regarding military telegraph lines operated by this Service, there must be a misapprehension as to their location, use, and extent.

This Service has built in the past fourteen years about 8,250 miles of *military* telegraph lines, which fortunately the rapid advance of settlement and civilization has reduced to less than 2,000 miles.

The telegraph lines owned by the United States and operated by this Service naturally divide into two classes:

1st. The military lines proper, maintained for military purposes only, but which also transact such commercial business as may offer.

2d. The sea-coast lines, which are of no value so far as any military necessity now existing is concerned, but which are of great value to maritime interests and to residents and visitors at or near the points through which these lines are built.

There are in existence at this time 1,905 miles of telegraph lines

which are used for strictly military purposes, and in connection with which four officers, 46 enlisted men, and 33 civilians of this Corps are now serving. These are frontier telegraph lines, used for facilitating military operations in the Indian country through which they pass, and insuring safety to the settlers by their presence.

It has been alleged that these lines are for meteorological purposes, and they have been even credited with doing an amount of weather telegraphing equal to that of all the commercial lines of the country. The weather observations made at the offices of the military telegraph lines are simply incident to the Service, and if the entire 1,905 miles of lines were abandoned to-day the efficiency of the general weather service would be in no wise impaired. The $24,000, charged against the Weather Bureau for the operation and maintenance of these lines, is in reality a part of ordinary Army expenses for military purposes, the execution of which devolves, by the strict terms of the act of Congress, approved June 23, 1874, on the Chief Signal Officer of the Army.

The value of most of these lines, from a military standpoint, cannot be questioned. It is apparent to every soldier that Arizona and New Mexico could not be efficiently protected against Indian outbreaks without the greater part of these military lines, and the value of the Rio Grande line, in avoiding serious complications on the Mexican frontier, has been set forth by the experiences of the past month.

These lines transact for settlers such commercial business as is presented, and the receipts from this source, aggregating for the past year $4,172.84, have been turned into the Treasury. The aggregate expenditures, including salaries of officers and men of the Signal Corps, amount to $66,700, exclusive of assistance given by the use of Army teams and labor, which if hired in open market, would have cost about $20,000 more.

The following table shows the location of these lines by departments together with their length and changes during the past year:

Military telegraph lines on June 30, 1888.

Military departments.	Miles.	Changes during year.
Dakota	382	Sold 135 miles between Glendive and Poplar River.
Missouri	239	Built 7 miles, Miami to Fort Elliott. Sold 90 miles, Fort Supply to Fort Elliott.
Texas	124	No changes.
California	12	No changes.
Columbia	253	Sold 61 miles, Fort Spokane to Spokane Falls.
Arizona	540	Sold 30 miles, Phœnix to Maricopa and 7 miles at Fort Huachuca.
Platte	375	Abandoned 3 miles, Fort Robinson to Crawford. Built 87 miles, Fort Du Chesne to Price Station. Transferred from Quartermaster Department, U. S. Army, 51 miles, from Fort McKinney to Powder River. Leased and repaired 152 miles from Rawlins to Fort Washakie.
	1,905	

The extension of the Saint Paul and Minneapolis Railroad to Poplar River resulted in the abandonment and sale of a section of 135 miles of telegraph line, from Poplar River via Fort Buford to Glendive. The remaining section of this line, from Poplar River to Fort Maginnis, 232 miles in length, is the most costly of all the telegraph lines connected with this Service. The intervening country is wild and desolate in the extreme, and generally without inhabitants, so that at Galpin, the repair station, this Service is obliged to maintain, at an expense of $1,630 per year, two civilian repairmen, since one will not live there alone. The total receipts from the line during the past year were $155.17, while the cost to the Government for maintaining and operating the section is over $4,000 annually.

In December, 1887, the Southern Kansas Railroad established a telegraph office at Miami, Texas, within seventeen miles of Fort Elliott, between which points a line was constructed out of old material from abandoned lines between Forts Elliott and Supply. The ninety-five miles of abandoned line, except such parts as were used in constructing the new line, were sold at public auction and the proceeds deposited in the Treasury.

The telegraph line between Fort McKinney and Powder River, which was built by the Quartermaster's Department to connect a military post with a commercial line, was transferred in July, 1887, to the charge of this Service, and has been operated by this Bureau since September 10, 1887.

The telegraph line between Fort Du Chesne and Price Station, Utah, a distance of eighty-seven miles, was completed in September, 1887. This work was done at the instance of the then Lieutenant-General commanding the Army, as a military necessity. The poles were cut and set by troops, and the wire and insulators were old material collected from abandoned lines, so that the construction of this line entailed no great expense upon this Service, although the management of it entails a cost of $5,000 upon the Service.

The telephone line between Fort Huachuca and Huachuca Station, seven miles in length, was sold at public auction in April, 1888, as the extension of a private line to Fort Huachuca rendered the further continuance of the Government line inadvisable.

The Chief Signal Officer continues the policy of abandoning and selling military telegraph lines whenever the advance of railways or the extension of the general telegraph system affords the Government an opportunity of reaching military stations over a private wire. No lines are extended nor are any general repairs made without the recommendations of the commanding general of the Army to the effect that such expenditures are necessary for military purposes.

SEA-COAST TELEGRAPH LINES.

There were in operation at the end of the fiscal year 561 miles of

sea-coast telegraph lines. The only line constructed during the year was built under the act approved February 17, 1887, and extends from Titusville, Florida, to Jupiter, Florida, 180 miles. This line connects the life-saving and light-house stations at Jupiter with Titusville, and is used to report all vessels passing near the station. The construction of the line cost $16,117.59; its annual expense for operation and maintenance will be between $6,000 and $7,000, and the receipts $600.

The section between Wilmington and Southport, North Carolina, is valuable to shipping interests, owing to the facilities it offers for storm warnings and the reporting of vessels. The annual cost of maintenance and operation is about $1,000, and the income about $90. The Hatteras section, from Hatteras Inlet, via Cape Henry, to Cape Charles by cable, and Norfolk by line, was formerly of very great value. There has been no year in which life and property have not been saved on the North Carolina coast by the operation of this line. Within the present year the British steamer "Kimberly" stranded near Wash-Woods, and through the prompt call of the Signal Corps operator the crew, cargo, and steamer were saved. The vessel and cargo were valued at $500,000. The march of invention, and the extension of the Life-Saving Service, render it practicable for the surfmen to operate this line with telephone apparatus, as is now done along the New Jersey, Delaware, and Virginia coasts. Such a course would prevent the duplication of a Government paid force and relieve this Service from the annual expenditure of $8,000, which the present manning of this line by experienced operators entails. The receipts from the line barely amount to a dollar a day.

The line from Narragansett Pier to Block Island has cost the Government about $55,000 in the past eight years, exclusive of the annual expenses, which aggregate about $4,000, against an annual income of $400. The line is of value to Block Island and, incidentally, to shipping interests.

The most important and valuable line on the Atlantic coast is the telegraph system connecting Nantucket and Martha's Vineyard with Wood's Holl, which has cost the Government about $50,000, apart from the annual expense of maintenance, which is about $6,000; the income is about $1,000 annually. These lines furnish communication to about seven thousand people throughout the year, and to about forty thousand during the summer months. The most important uses of the lines, however, are for the display of storm signals for the benefit of the sixty thousand vessels which annually pass Gay Head, and the summoning of assistance for scores of vessels in distress. The ice blockade of January, 1888, caught over fifty vessels in the ice within sight of Nantucket. If it had not been for this system of cables, by which powerful tugs and revenue cutters were summoned from all quarters, there would have been serious losses of life and property. It is believed that in this single instance, apart from human life pre-

served, the original cost of land lines and cables was equalled by the value of the property saved.

The sea-coast service is represented on the Pacific coast by the Cape Flattery and Fort Canby cables. These lines are valuable for the reporting of vessels and the summoning of assistance in cases of distress. They cost this Service $8,000 annually, while the income is substantially nothing, being less than $50 a year. The new Point Reyes telegraph will be a third line of the same character, and for the same purpose, although the annual cost of maintenance and operation will probably not exceed $1,000.

The very great expense of these sea-coast lines has unduly weighed down the appropriations of the Weather Service in past years, and, in view of this fact, the Chief Signal Officer has deemed it important that he should clearly set forth that over $100,000 of his appropriations are chargeable against sea-coast and military telegraph lines which are only of slight and incidental value to the general weather system of the country. The Chief Signal Officer, in view of this fact, has transmitted with his annual estimates a list showing, in detail, the location, length, number of employés, and cost of maintenance and operation of the separate lines. There is no intention of ignoring the fact that the reporting of vessels and the summoning of assistance in case of maritime disasters are services of inestimable value which the General Government should render, but the object and character of the work should be clearly set forth, so that distinctive and necessary appropriations may be made therefor.

Appendix No. 8 consists of the very full and comprehensive report of 2d Lieutenant F. R. Day, Signal Corps, whose statements and recommendations are worthy of careful consideration. 2d Lieutenant B. M. Purssell is entitled to commendation for the energy and care exercised by him in locating and supervising the construction of the Point Jupiter line. 2d Lieutenant W. D. Wright has shown intelligent zeal and energy in the repair and maintenance of the Nantucket and Block Island systems. His successful efforts in putting his lines in perfect working order, at a small expense and under difficult circumstances, are worthy of notice and commendation. 2d Lieutenant James A. Swift, Signal Corps, has managed in a satisfactory manner the telegraph lines in Oregon and Washington Territory.

2d Lieutenant William A. Glassford, Signal Corps, has maintained and operated in a thoroughly satisfactory manner the difficult telegraph lines in Arizona and New Mexico, and in addition to his telegraphic work has voluntarily devoted his leisure time to the collation and discussion of weather data of value to that section of the country.

THE CORRESPONDENCE DIVISION.

2d Lieutenant James Mitchell, Signal Corps, has been in charge of the Correspondence Division for the greater part of the year.

Thirty-seven boards of trade, chambers of commerce, and other commercial organizations, have conferred with the Chief Signal Officer in relation to Service details, a list of which is given in Appendix No. 9.

Every effort has been made to reduce the methods of conducting the correspondence of the office to the simplest form, to the end that while due regard is paid to the proper record of public business, it may be transacted with the greatest possible speed and with the least clerical labor. The enormous volume of correspondence, averaging over fifteen hundred communications each working day, could not be conducted under old methods without a very great increase in the clerical force. Under the present system a large amount of correspondence is transacted by dictation and type-writing, and only letter-press copies are made. This method presents economical and other advantages, since it is more rapid, and the retained copy is a fac-simile of the signed letter, free from clerical errors in copying.

The current business of the office has been discharged with the usual dispatch, and, besides, the war records of the Signal Corps have been thoroughly indexed. The organization, methods, and records of this division are now such that all important letters are answered the day of their receipt, and requests for information in pension and other claims are, as a rule, reported on in thirty-six hours.

During the year there have been sent from this office, including all its divisions, 159,751 communications, and 314,871 communications received. Not included in the above, 1,021,000 code words and weather reports have been sent and received by telegraph.

Notwithstanding this enormous amount of clerical work the duties have been performed more expeditiously than usual and with a decreased force, the number of clerks on duty at the beginning of the fiscal year being fifteen, and at the close eleven.

The Chief Signal Officer respectfully invites attention to the great and apparently profitless consumption of time, at Government expense, entailed by the daily reports of work, made by each person performing clerical duty, to the chief clerk of this office, as prescribed by existing orders. It is within bounds to estimate that the cost of such work to the Government consumes the time of four clerks, at an expense of about $4,000 annually. The outcome of such daily reports is a summary, which, indeed, tells how many letters have been read and distributed, how many briefed, recorded, and numbered, how many noted, and other items of like character, but it is impossible that data of this character shall give any adequate idea of the amount of work annually performed by the clerk. Many letters are of such a character that fifty such letters daily would not be an arduous task for a type-writer or copyist, while others are of such length and are written under such disadvantages that ten of them would entail a hard day's work.

The chiefs of divisions should be, and are believed to be, men of such character and standing that they can be relied upon to see that the

clerks under their charge do a fair day's work for the Government, and in case any division chief is inclined to favor any person under his charge, he is enabled, under the present system, to so arrange matters that the poorest clerk in the division can have the largest record on paper. It is urgently recommended that the report be discontinued.

An enormous number of obsolete forms and valueless papers have accumulated in this Service during the past eighteen years. These worthless papers have been dignified by the name of records, although they really are not such, since they contain data which, once seen for the purpose of checking other papers, immediately become useless.

It is respectfully recommended to the honorable Secretary of War that Congress be asked to appoint a commission or an inspector of public documents, who shall be authorized to take charge of all worthless public papers, and report their character to Congress, with a view to their final destruction. Not only are these papers worthless, but they are a great tax upon the office space of the different bureaus.

STATIONS DIVISION.

The Stations Division has remained in charge of 2d Lieutenant F. R. Day, Signal Corps, whose energy and extended knowledge of the personnel of the Service as well as of the separate stations, has contributed to increased efficiency in this division. Lieutenant Day's report forms Appendix No. 10.

Urgent recommendations for new stations have been frequently made, but their establishment is impossible without increased appropriations. The present number of stations is sufficiently large for the general needs of this Service, although it is certain that in a few cases the stations might be better arranged for the general good of the country. It is possible that a few additional stations could be established and maintained, strictly in local interests, as is the case with Baltimore, Md., New Haven, Conn., and other stations in large and important cities. The changes which have been made in the river, display, cotton-region, rainfall, and other stations are set forth in detail in Appendix No. 10.

The Chief Signal Officer has endeavored to bring the detailed meteorological information collected by this Service as promptly as possible to the attention of the public, and in no other way can this be done so thoroughly as by the distribution of the weather map. The cyclostyle weather map, published at about forty of the larger stations, has been received with great favor by the business community, as it presents the data in such a manner as to be easily understood and utilized by such business men of the country as have interests affected by weather conditions.

A more liberal and extended policy has been arranged for the ensuing year, through which it is hoped to furnish the daily weather maps for 8 a. m. and 8 p. m. to every prominent town that can be reached

within a reasonable time from Kansas City, Mo., Saint Louis, Mo., Boston, Mass., New York City, and Washington City, and the 8 a. m. map from Cincinnati, Ohio, and Philadelphia, Pa.

The efforts made to increase the high standing of the men in the Corps have resulted in a more prompt rendition of meteorological reports and a higher standard of accuracy.

The Chief Signal Officer is pleased to report that the appropriations made for the rent and expenses of stations are now sufficient to maintain the present stations decently and efficiently, and that the practice which has obtained in past years of discharging the charwomen and cleaners in the middle of the year is no longer necessary. It has been the policy of this Bureau to discourage establishing more stations than can be properly maintained by current appropriations. Small economies and petty deprivations do much to harrass and annoy the observers in charge of stations, and it cannot reasonably be expected that they shall show that interest and spirit in the management of the more important matters connected with their stations when they are obliged to perform their work under such wretched surroundings as not infrequently obtained in the past at Signal Service stations.

The Chief Signal Officer has endeavored to cultivate a spirit of pride and emulation among the observers throughout the country by encouraging and inviting suggestions as to the proper methods of increasing the usefulness of the Service. Observers are encouraged to write upon meteorological and other scientific subjects, and in no case has any observer been refused permission to publish on his own responsibility any memoir the results of his investigations.

The labor on stations has been lessened as much as possible by reducing the number of forms and their frequency, and also by curtailing as far as possible all duty and observations which do not have some important end in view. Such a course leaves the observers more time to study local climate, to cultivate official relations with the leading exchanges and societies of the various cities, and to give that considerate attention to applicants for information which the general public has a right to expect from its public officials.

Appendix No. 11, prepared by Assistant Professor H. A. Hazen, shows list of stations, together with their geographical position, elevation, and other data of interest and value.

THE INSTRUMENT DIVISION.

The Instrument Division for the greater part of the year has been under the intelligent and practical supervision of Assistant Professor T. Russell, who personally inspected, compared, and examined all thermometers, rain-gauges, and other meteorological instruments. The tests have been conducted with the utmost care and precision to insure accuracy. Every thermometer is carefully tested at the freezing point of water, and for every ten degrees between that point and a tempera-

ture of 112°; below the freezing point of water it is tested for every twenty degrees to —28°. The rigid requirements of the Service, which reject all thermometers with errors greater than 0°.3 F., are still enforced. 2,832 instruments of various kinds have been received, and 2,380 issued during the year. Assistant Professor Russell tested 2,180 thermometers for the Service, and 20 for voluntary observers. In addition to the ordinary testing of instruments, the telegraph wire purchased for military field lines, or for sea-coast lines, has also been tested.

The purchase and testing of instruments for private parties has been discontinued, save in special instances, when such comparisons and tests are plainly in the interests of the public service, as in the case of the directors of state weather services, or of persons engaged in special investigations requiring standard instruments.

In addition to his usual work Assistant Professor Russell has been charged with the ascertaining of the amount of evaporation throughout the United States, from which investigation some interesting and valuable data is anticipated the coming year.

The report of Assistant Professor Russell is given in Appendix No. 12.

With a view to determining with greater accuracy the coefficient of the Robinson anemometers which are used for determining the velocity of the wind, the Chief Signal Officer established during the year a board consisting of Assistant Professors Hazen, Russell, and Marvin, who were directed to make careful and complete observations upon this point. The difficulties attending such experiments are great, but it is hoped that they have been overcome. One essential point, the use of a closed space for experiments, was obviated by the courtesy of the Commissioner of Pensions, who granted for this purpose the use of the court in the Pension Building. The experimental work so far done shows that the coefficient of 3.0, that is the relation between the velocity and travel of center of cup, for the Signal Service pattern of instrument (a 4-inch cup on a 6-inch arm) is nearly correct for a velocity of twenty miles. For five miles it gives results for velocity fifteen per cent. too small, and for ten miles eight per cent. too small.

EXAMINER'S DIVISION.

The work of this division has been kept up to date as nearly as the nature of the money and property accounts which are examined therein would permit. The elaborate and intricate routine of this division has been modified so as to greatly decrease the work, simplify the adjustment of accounts, and facilitate payments to creditors. Care and attention has been given to insure the practice of economy and prudence in public expenses before the money is spent rather than afterwards. This method has increased the personal work and direct responsibility of the Chief Signal Officer, since no purchases or expenditures can be made without having been previously and personally authorized by him.

To simplify expenditures the fixed charges against the appropriations

are authorized at the beginning of the fiscal year by a special order, which gives in detail the purpose for which the money is to be applied, and limits strictly the amount which is to be spent. In the case of weather reports, where the number of words cannot be fixed, a special order is issued which gives for each month the maximum number of words and the rate allowed for each word over the different circuits. Whenever from any cause the authorized number of words is exceeded, the case is presented to the Chief Signal Officer for his personal orders. Under this method the Chief Signal Officer is able to fix definitely against the Service the charges for three-fourths of the appropriations at the beginning of the fiscal year. Such an arrangement also enables the chief to give more care and attention to the varying and indeterminate expenditures.

The addition of the disbursements previously made by the Medical, Quartermaster, and Subsistence Departments to the duties of the Disbursing Officer of this Corps necessarily entails extra work upon the Examiner's Division, which is obliged to pass on those voluminous accounts. The changes of methods have enabled this additional work to be performed without increasing the clerical force.

A summary of the work performed forms Appendix No. 13.

BIBLIOGRAPHY AND LIBRARY.

The Chief Signal Officer has to regret the resignation of Mr. C. J. Sawyer, whose valuable labors in connection with the general bibliography of meteorology insured the satisfactory completion of that great work. The appointment of Mr. O. L. Fassig, who served as an assistant to Mr. Sawyer, as bibliographer and librarian, insures a continuance of the systematic and careful arranging and cataloging already initiated.

The general bibliography of meteorology consists of about 50,000 independent titles, classified by subjects, arranged in about two hundred divisions, and of a card author index of nearly 13,000 authors. This includes separate publications and articles in serial publications, and terminates January 1, 1882. In addition to the above the present librarian (Mr. Fassig) is engaged with Mr. Hilton, his assistant, in a supplementary catalogue for current use in the office of the Chief Signal Officer. This supplement contains about 5,000 cards, arranged according to authors, but as current work has not permitted a complete classification, it embraces only such separate publications and articles in periodicals as are easily accessible. This supplementary author catalogue is now being classified by subjects after the scheme of the general index. The latter work will soon be rendered more complete by an alphabetical subject index.

The Chief Signal Officer pointed out in his last annual report the great value of this bibliography to scientific meteorology as well as to the arts and industries, as it makes available to students and

practical men the literature of applied meteorology in its relations to agriculture, commerce, engineering, and medicine. Not only is it of value as regards the question of crop production, distribution of vegetable life, forestry, floods, river and ocean navigation, but also as regards medical climatology, with reference to the extent and spread of epidemic diseases, the importance of which question is evident to every reflecting mind in connection with the yellow fever epidemic now prevalent. Any medical student who desires to investigate this question knows not where to turn for information as to existing climatological data and its bearings as pointed out by previous investigators. The use of such a bibliography in bringing to the notice of the investigator the labors of his predecessors, not only would result in preventing duplication of work and a needless waste of intellectual effort, but through economy of time would enable the investigator to devote himself to the more important deductive labors. The progress of scientific research is now retarded and labor therein wasted, owing to the impossibility of readily ascertaining what has been done by one's scientific predecessors.

Over one-half of the material of this bibliography has been contributed through the voluntary labors of foreign and American librarians and meteorologists. The publication of this work would be an act of reciprocity of exchange from the Government towards voluntary contributors. The Chief Signal Officer urgently recommends that its publication be recommended to Congress, at a cost not exceeding $10,000.

The library has been increased by purchase, exchange, or gift 475 volumes, and now contains 10,320 volumes, exclusive of pamphlets, which, although catalogued, have never been numbered as books. The library has already been moved to the new office building, where it is hoped that suitable shelving may be provided the coming year; and with this view the necessity of this Service receiving the amount estimated for as a contingent fund is strongly urged. The policy of strictly confining purchases to such meteorological and military-signal works and periodicals as is necessary to increase its value as a working library has been rigidly followed.

RECORDS DIVISION.

The Records Division has been under the attentive charge of 2d Lieutenant J. P. Finley, Signal Corps. The establishment of this division has resulted in a great economy of labor, and has proved of marked benefit to the public, who apply to this office for meteorological information. The hundreds of volumes and thousands of forms, which in previous years were so badly arranged and so deficiently indexed as to render it practically impossible to obtain any consecutive data pertaining to the voluntary stations, have been rearranged in orderly sequence and by states, while the present system and condition of the indexes are such that data from any station can be instantly referred to.

Great progress has been made in bringing together all available data bearing on precipitation and temperature, and within the coming fiscal year the Chief Signal Officer expects to have in convenient and compact form all such records of any length which have ever been kept in the United States. During the past year this office has had the hearty co-operation of the Secretary of the Smithsonian Institution and of the Surgeon General, U. S. Army, who have placed at the disposal of this office all available data of this class. In addition a large number of voluntary observers have furnished records varying in special cases from ten to fifty years in length. The orderly arrangement and proper indexing has been true economy, as the demands made upon the office for meteorological data, either for use as evidence in courts or for scientific purposes, are yearly increasing. In the past the labor of finding records from which the abstracts were made involved far more time and effort than did the copying of the data. The records of the office are in such condition that any given meteorological data can be referred to without loss of time. The voluntary records should be as accessible and convenient for reference as are the observations of the regular stations. It seems only proper that the work of thousands of voluntary observers, who have given so freely of their time and interest, should be recognized by a proper compilation of the results.

Applications for meteorological information are increasing, so that, except in special cases where the public interest demands further consideration, it has been necessary to restrict the furnishing of information to two hours gratuitous labor. Whenever the data requires more time, the applicant is permitted to obtain it through the work of clerks outside of office hours, at the rate of forty cents per hour. Even with this restriction, on an average, one application daily is received, a considerable portion of which transcripts require certification under seal of the War Department, for use as testimony in courts of law. There have been during the year one hundred and sixteen cases in which the records of this Corps have been used as evidence in court. In many other instances the records have been accepted as convincing evidence which obviated recourse to litigation.

There have also been furnished for the use of medical and other professional men, for discussion and research, for use in connection with commercial enterprises, three hundred and thirty-four extracts regarding weather conditions. The office has also furnished the office of the State Engineer of California with monthly rainfall data for one hundred and seventy-nine stations in California, which cover periods ranging from one to forty years. Data of a similar character covering the monthly and annual mean temperature for one hundred and eighty-seven stations, and monthly and annual precipitation, together with maximum and minimum amounts of rainfall for the month, for one hundred and twenty-one stations, have also been furnished to the Commissioner of Agriculture for the State of Texas.

The reorganization of the Records Division in this office has made it possible to utilize a large amount of rainfall data furnished by voluntary observers prior to 1874 in the preparation of the monthly rain charts from January 1, 1870, to December, 1873. These charts are not only valuable for current work and study at this office, but have been utilized in preparing the eighteen-year normal rain charts now being regularly issued in the "Monthly Weather Review," and are also specially valuable in the study of weather conditions when considered in connection with crop production, and in the study of river floods, rendering it possible to trace their origin.

The most important work devolving upon this division was the preparation of tabulated statistics of precipitation for Washington Territory, Oregon, California, New Mexico, Utah, Nevada, Idaho, Wyoming, Colorado, Indian Territory, and Texas, called for by the Senate of the United States by Resolution dated January 4, 1888. This work exhaustively treated all available data, and the report sets forth in chronological and geographical arrangement the rainfall for the districts above mentioned.

Appendix No. 14 is the general report of the officer in charge of the Records Division, and appendices Nos. 17 to 32 comprise such tables, compiled in the Records Division, as pertain to public business in connection with the Signal Corps and are necessary in current work. These tables are valuable adjuncts to the preparation and study of forecasts and also greatly facilitate the work of the office in supplying to hundred of applicants valuable data which otherwise could not be furnished.

PUBLICATIONS DIVISION.

2d Lieutenant Fielder M. M. Beall, Signal Corps, has been in charge of the Publications Division during the greater part of the year, and has applied himself to acquiring a practical as well as theoretical knowledge of the best methods for doing the printing and lithographing work of this office. The value of the data published in the weather map and bulletins of this Service depends on the promptness with which it reaches the general public, and every effort has been made to introduce methods which would attain this end. It is believed that the rapidity, accuracy, and skill with which this work is done is largely due to Lieutenant Beall's energy and intelligent efforts.

For the first time in several years the current work of this division is promptly performed, while very rapid progress is being made in bringing up the arrears which have annoyed and harrassed the working force. In addition to the ordinary work of printing, Lieutenant Beall has made a full and careful inventory of the many thousands of maps, charts, and publications which had accumulated in this office, and has in accordance with special instructions from the Chief Signal Officer distributed the extra publications to the great libraries of the country,

and to agricultural and other kindred societies. Such improvements have been made in methods of stitching and mailing the publications that all co-operating observers and officials entitled by exchange to the publications of this Service now receive them without delay.

The labor devolving on this division may be surmised from the fact that nearly 190,000 publications have been distributed during the past year. The report of the Publications Officer forms Appendix No. 15.

PROPERTY AND DISBURSING DIVISION.

Captain Francis B. Jones, Assistant Quartermaster, has performed throughout the year the arduous and complicated duties involved by his detail as Disbursing Officer of the Corps. The Chief Signal Officer expresses his appreciation of the diligent care exercised and accurate knowledge shown by Captain Jones in his administration of the accounts of this Service.

Although the transfer of Commissary, Medical, and Quartermaster accounts to this office has of necessity largely increased the current work, yet such rearrangement and improvement, in the direction of simplicity of business methods, have been made that the work has been done with a reduction of two in the clerical force of this division, and the accounts in question have been satisfactorily adjusted. Approved methods have been adopted, so that the entire system of accounts now strictly conform to the legal requirements and decisions of the auditing officers. The changes made in methods of business are set forth in the report of the Property and Disbursing Officer. (Appendix No. 16.)

Careful personal attention has been given by the Chief Signal Officer and the Disbursing Officer to the proper expenditure of the appropriations for this Service. They have been administered with economy and strictly in accordance with law. Every effort has been made to reorganize the methods of the Service so that its financial management and practical work should conform to practices in vogue in large business establishments.

The Chief Signal Officer again invites attention to the inconveniences and grave results that have followed the exhaustion of sub-appropriations for this Bureau. It is believed that the interchangeability of appropriations within narrow limits are as much in the interests of economy as of efficiency. It has been pointed out that such a slight interchangeability of appropriations would enable the chief of this Service to submit estimates somewhat smaller than those made at present. Under any method it is necessary that a small margin should be made on all estimates which are not for salaries or other fixed and definite expenditures, and this margin could be safely made much smaller in case such latitude was allowed.

The policy has been continued of reducing to a minimum amount the work done in the carpenter and machine shops of this Service, and they are used only for such experimental and repair work as the exigen-

cies of the Service may require or as from its trifling character would not warrant the delay and expense of inviting proposals. It is believed that the policy of doing all extended work or manufacture through the system of outside competition is the most economical for the Government.

The Property and Disbursing Officer gives in his report a list of contracts entered into during the fiscal year ending June 30, 1888 (Appendix No. 16), as required by the act of Congress approved April 21, 1808. (Statutes-at-large, vol. 2, p. 435.)

The Chief Signal Officer is pleased to report that one of the important practical reforms of the year has been the intrusting to the Disbursing Officer of this Corps the payment of the commutation allowances for rations, for quarters, and for fuel, and also the settlement of medical accounts. The only appropriations of this Corps not now disbursed directly under the Chief Signal Officer are those for the pay proper, which remain in the hands of the Pay Department, United States Army. This reform has resulted in the payment of the men of the Corps serving in Washington City promptly on the last day of each month; on which day also the checks are mailed to the men serving at various points throughout the country. This change in methods has not only benefited the men by insuring their payment at earlier dates, but has also saved a very large amount of time to the Government. Previously the enlisted men serving in Washington City were paid on three different dates by three separate officers, an unbusinesslike method, which caused loss of time and duplicated work.

The Chief Signal Officer invites attention to the following recommendations of the Disbursing Officer, which he heartily concurs in, believing that their adoption would be thoroughly in the interests of the public service:

First. That bids should be in single copy, and not in duplicate.

Second. That small purchases, less than $50 in amount, should be made in open market by methods in vogue among the business men of the country. The present system of advertisement involves delays of from ten to thirty days and a large amount of clerical work to prepare all the papers, with other attending expenses.

Third. That contracts for small amounts, say less than $100, should be in duplicate, and not in quintuplicate, as is now necessary even for amounts as small as ten or twenty dollars.

Fourth. That the entry of letters into record books be discontinued, since the method followed by business men of numbering such letters in regular sequence and the keeping of copious index-books, as is now done, are sufficient for all practical purposes.

Fifth. That all accounts of the Signal Service should be audited by one auditor.

Especial attention is called to the recommendation to secure to the enlisted men of the Signal Corps when traveling, a sufficient allowance

to enable journeys on public business to be made without loss to the enlisted men of this corps. Public travel should neither be a source of revenue, nor should it entail personal loss.

APPROPRIATIONS.

The condition of the appropriations (disbursed by this office) for the fiscal year ending June 30, 1888, with the expenditures thereunder and the balances, with probable demands on such balances, report of which is required to be rendered by the act of Congress approved May 20, 1820, is as follows:

Appropriated:		
Observation and report of storms		$288,518 75
Signal Service:	Regular supplies	57,151 85
	Incidental expenses	772 00
	Transportation	23,300 00
	Barracks and quarters	85,440 00
	Subsistence	148,000 00
	Medical Department	8,200 00
Signal Service of the Army		8,000 00
Observation and report of storms		177,564 32
Signal Service:	Regular supplies	53,638 42
Expended:		
Signal Service:	Incidental expenses	178 68
	Transportation	17,858 80
	Barracks and quarters	82,712 11
	Subsistence	143,464 00
	Medical Department	2,527 90
Signal Service of the Army (includes settlements made in Treasury)		1,897 59
Balances:		
Observation and report of storms		110,954 28
Signal Service:	Regular supplies	3,513 43
	Incidental expenses	593 32
	Transportation	5,141 20
	Barracks and quarters	2,727 89
	Subsistence	4,789 00
	Medical Department	672 30
Signal Service of the Army		6,102 41
Probable demands:		
Observation and report of storms		95,500 00
Signal Service:	Regular supplies	500 00
	Incidental expenses	15 00
	Transportation	5,000 00
	Barracks and quarters	150 00
	Subsistence	150 00
	Medical Department	600 00
Signal Service of the Army		6,072 02

Of appropriations "without year" the amounts expended therefrom, the balances on hand, and the probable demands, are as follows:

Appropriated:	
Establishing signal station, Point Jupiter, Fla	$17,000 00
Repair Signal Service cable, Columbia River	5,500 00

Expended:	
Establishing signal station, Point Jupiter, Fla	$16,031 13
Repair Signal Service cable, Columbia River	449 50
Balances:	
Establishing signal station, Point Jupiter, Fla	968 87
Repair Signal Service cable, Columbia River	5,050 50
Probable demands:	
Establishing signal station, Point Jupiter, Fla	14 00
Repair Signal Service cable, Columbia River	4,978 43

ESTIMATES.

The reduction of over $80,000 in the estimates for the previous fiscal year placed them at practically the lowest amounts for which the Service can be efficiently conducted under its existing organization. The estimates for the fiscal year ending June 30, 1890, are $1,991.64 less than those for the current fiscal year. It may be added that in case Congress should see fit to increase the number of stations connected with this Service that a corresponding increase in the entire appropriations would be necessitated.

GENERAL REMARKS.

The work of weather predicting demands peculiar talents of a high order, and a lack of success in this work does not necessarily detract from the ability or capacity in other fields of scientific research. The Chief Signal Officer has given careful consideration to this question, and has strongly urged upon Congress a reorganization of this Corps as would insure the retention of such officers connected with it as possess peculiar fitness and special powers of insight for weather forecasting. There is no officer or civilian connected with this Service who has shown any decided inclination in the meteorological work, or has shown ability or capacity for it, who has not been given an opportunity of practice predictions. The labors of the individual officers of the Service must naturally reflect upon the Chief Signal Officer, credit or discredit, and so he has followed the method which he believed would enhance his own reputation, as well as subserve the public interest, that is by selecting the best men for the work.

As has been pointed out in official communications and in a previous report, the policy followed in legislation has been directly contrary to that outlined by the chief of this Service. Legislation has been all in one direction—to relieve and separate from the Service such officers of skill, insight, and special talents as by successful work and zealous devotion have proved their capacity beyond question.

The Chief Signal Officer has appreciated the importance of this Service putting before the world memoirs which shall show that in addition to the practical daily work of weather forecasting and the distribution of storm signals, he desires to make available for the use

of the general public such deductions as a careful study and analysis of the meteorological data of the Service may render possible.

To Professor Cleveland Abbe, as the assistant of the longest experience, and as a member of the National Academy of Sciences, was intrusted the important duty of preparing a popular, non-mathematical exposition of the laws of storms, with a view to their better prediction, and in connection with a study of their diurnal variations, to constitute a deductive method of storm predictions. Excepting during the months of March and May, 1888, when Professor Abbe served as the regular predicting officer, and the time occupied in the proof-reading of his treatise on meteorological instruments, Professor Abbe has devoted himself to this valuable and important work, to which he was assigned in July, 1887. The work at the present time is in the shape of a sketch only, and in deference to the expressed opinion of Professor Abbe, the Chief Signal Officer defers recommending the publication of this work until it is in a completed state, when it is hoped that it will prove to be of great practical as well as theoretical value.

As regards his subordinates engaged on scientific work, whether officers or civilians, the Chief Signal Officer has taken, as is necessary, such steps as have secured the prompt and efficient execution of routine work, and at the same time he has encouraged, to the largest possible degree, independence among those engaged in scientific work, and he has left them free to initiate that particular class of work for which they believed they had a bias or inclination, restricting them only, as the law requires, to the consideration of such scientific work as should bear theoretically or practically upon meteorology and weather forecasting. The Chief Signal Officer has given his subordinates fully to understand that as far as lies in his power their advancement and positions must depend on their capacity for meteorological research.

The positions of the civilian assistants in this Service have heretofore depended on a temporary appropriation, and until the successful efforts of the Chief Signal Officer, during the past fiscal year, the professor and assistant professors have never been recognized in appropriation bills as connected with the Service. Nor have they ever felt sure that the rate of their pay would not be materially changed from year to year, or even from month to month. This spirit of doubt and uncertainty must have had a depressing effect upon those connected with the Service, which it is hoped will be removed by the action of Congress in placing their names on the permanent roll with a definite salary. It is believed that if such permanent employment, at reasonable salaries, had existed in prior years, the Chief Signal Officer would not have to regret the separation from this Service of such able scientists and meteorologists as Professors Ferrel and Mendenhall.

In order that the character and scope of the verbal instructions given

by the Chief Signal Officer to his civilian assistants might not be misapprehended, he thought it best to put his instructions in permanent form, and on September 1, 1887, did so in the following language:

With a view to insuring the greatest possible benefit and scientific results from the employment of the civilian professors in connection with this Service, it is directed that the Professor and Assistant devote himself entirely to the inquiry into scientific matters tending to advance the science of meteorology; such work to be to the positive exclusion of any routine work, which will be permitted only to such extent as may be necessary to afford relief to that officer from too constant application to scientific research.

The junior professors now engaged on certain special important work, assigned to them by the Chief Signal Officer, will occupy at least one-third of their time in scientific investigation and researches bearing upon the practical work of this Service. Freedom of action and selection will be granted, so that these officers may not be hampered or restricted in their labors.

The attention of the junior professors is especially called to the importance of their making such preparatory studies and practice indications as will fit them for practical duty as indications officers of this Service, it being the intention and desire that the best possible results may be obtained for the general public from the labors of this Service.

The Chief Signal Officer calls attention to the exemplary conduct of the men of this Corps serving in Florida during the present yellow-fever epidemic. The observers at Jacksonville, one of whom experienced a serious attack of the fever, have not only regularly and efficiently performed their duty to the Government, but they have assisted in ameliorating the unfortunate condition of the fever stricken. All other observers in Florida have served faithfully during this time, and they have neither made efforts nor availed themselves of the efforts of others to avoid, under trying circumstances, the duties for which they were enlisted. Communications from others, out of the immediate fever district, indicate, however, that some of the observers of this Service would have immediately quit their stations had they not been enlisted men.

The Chief Signal Officer feels it proper to allude to the efficiency of the clerks and enlisted men serving under his immediate charge. More than fifty per centum of the entire force were not absent from their duties a single day through sickness, and the average loss to the Government, including prolonged illnesses of several employés who have since died or been discharged for disability, was less than seven days for each person. Less than fifteen per centum of the clerks were tardy, and the entire loss through this cause was less than a half day for all cases of tardiness during the year.

It has been the unpleasant duty of the Chief Signal Officer to invite the attention of his superiors to officers of this Corps who are physically and mentally unfitted to perform the duties in connection with the work of the Service. But as regards mental unfitness, it was decided that there was no legal method of retiring such officer. It is respectfully urged that any legislation concerning the future of this Service should contain such provisions as will insure at least the mental com-

petency of the officers connected with it. The harm resulting from inefficiency and unreliability on the part of the higher officials of any corps does not end alone with the personal acts of such officials, but has a tendency to demoralize and impair the efficiency of all members of the service with whom they are thrown in contact.

ORGANIZATION OF THE SIGNAL CORPS.

The military re-organization of this Service is one demanded in the interest of justice, economy, and efficiency. But two detached officers of long experience remain on duty with this Corps, and the high standard of their work emphasizes the necessity of their retention. The relief of other officers to replace them by young, untrained, and inexperienced men, has sadly impaired the accuracy of weather predictions, and been to the injury of the general public, who have a right to demand that competent men shall be retained, and incompetent officers weeded out. The re-organization which is hereafter recommended reduces the number of officers by eight. With this decreased number, if their competency is insured by proper examinations, the service can be better performed than it is with the present number. An incompetent or inefficient officer, who can only perform duty of a simple and routine character, is worse than valueless in this Service.

The re-organization, in addition to increasing the efficiency, will result in the saving of thousands of dollars annually to the Government, and will also give the officers of the Corps that chance for future advancement which every faithful, competent officer should have, and which has been denied to this Corps of the Army only.

In case the honorable Secretary of War still adheres to his opinion that a transfer of this Service to another department is advisable, it is respectfully urged that such legislation be recommended as will properly provide for the military duties devolving by law on the Chief Signal Officer. It has been pointed out in this report that the care of the strictly military telegraph lines will involve an increase of appropriations exceeding $60,000 annually.

An organization comprising, besides the Chief Signal Officer, one major, five captains, five first lieutenants, two professors, and three assistant professors would be sufficient, providing the officers were competent for all duties. The grade of second lieutenant should not exist in this Corps, and no officer should be retained or promoted who is incompetent.

The Corps, which in 1887 had an authorized force of 470 enlisted men, is now reduced to 320. The Chief Signal Officer is further of the opinion that the Corps could be economically reduced still another hundred, and that from the first of July, 1889, the Corps should be 125 sergeants (25 first class observers, for great cities, and 100 second class observers), 50 corporals, and 50 privates. In such latter case the appropriations for pay and allowance of enlisted men could be reduced

$100,000, and in lieu of such a sum should be appropriated $80,000 for the pay of civilian assistants. With such a proviso the assistants at observing stations throughout the country could be economically replaced by civilian assistants, as at many stations the work is such as to require the aid of an assistant only six months in the year.

In lieu of the complicated system of commutations for quarters, fuel rations, and clothing, which also entails two distinct (monthly) payments from two different bureaus, it is recommended that there shall be granted to every man of the Signal Corps, not receiving allowances in kind, a fixed sum, which shall be paid by the same officer as the pay proper. It should be further recognized that observers serving in great cities (those exceeding 100,000 by last census), or as assistant directors of state weather services, have most important duties, and that those serving in isolated or yellow fever districts merit proper allowances, and to such the commutation should amount to $65 for food, quarters, fuel, and clothing, while to others an allowance of $55 would be reasonable. The average monthly allowances have always somewhat exceeded $63 in Washington. There are certain sections where the employment of civilian assistants would not prove satisfactory, and where only the restraints imposed by military service would insure meteorological duties being performed continuously. As a rule, to the southward of the twenty-ninth parallel, or westward of the ninety-seventh meridian, the character of the climate and the social conditions which obtain are such as to prevent this office from procuring, at moderate salaries, suitable civilian assistants. It is probable that yearly 25 per cent. of the enlisted men within the regions named would quit this Service if they were not held by their enlistment. The rates paid to unskilled labor, even, are greater in these regions than those now allowed by the Government to men of this Service. In consequence, pecuniary temptations and other kindred causes impel observers serving in such places to quit the Corps as soon as possible.

I am, very respectfully, your obedient servant,

A. W. GREELY,
Chief Signal Officer.

APPENDICES ACCOMPANYING THE REPORT OF THE CHIEF SIGNAL OFFICER OF THE ARMY, FOR THE FISCAL YEAR ENDING JUNE 30, 1888:

No. 1.—Report of officer in charge military signaling division.
2.—Report of officer in charge of verification of indications.
3.—Report of Lieutenant Maxfield on the operations of the Signal Service on the Pacific coast.
4.—Summary of work performed in review division.
5.—Report on state weather services, and other co-operating meteorological societies.
6.—Rivers and floods.
7.—List of stations inspected during the year.
8.—Report of the officer in charge of telegraph division.
9.—Report of the officer in charge of correspondence division.
10.—Report of the officer in charge of stations division.
11.—Latitude, longitude, elevation, etc., Signal Service stations.
12.—Report of the assistant professor in charge of the instrument division.
13.—Report of the examiner's division.
14.—Report of the officer in charge of records division.
15.—Report of the officer in charge of publications division.
16.—Report of the property and disbursing officer.
17.—Table of miscellaneous data, annual summaries Signal Service stations.
18.—Table of monthly normal temperature and departure therefrom for 1887, Signal Service stations.
19.—Table of fifteen year normal pressure and temperature.
20.—Table of monthly mean temperature for 1887: voluntary observers, military posts, state weather services and railroads.
21.—Table of mean maximum and mean minimum temperatures for 1887, Signal Service stations.
22.—Table of mean maximum and mean minimum temperatures, May to October, 1887, inclusive, cotton-region stations of the Signal Service.
23.—Table of maximum and minimum temperature and yearly range at Signal Service, voluntary observer, military post, state weather service and railroad stations for 1887.
24.—Table of monthly and yearly precipitation for 1887, all sources.
25.—Table of monthly maximum velocity of wind for 1887, Signal Service stations.
26.—Table of average hourly velocities of wind for 1887, Signal Service stations.
27.—Table of average cloudiness for 1887, Signal Service stations.
28.—Table of average number of clear, fair, cloudy, and rainy days, since beginning of observations, Signal Service stations.
29.—Table of first and last killing frosts, Signal Service and voluntary stations.
30.—Table of mean relative humidity for 1887, Signal Service stations.
31.—Table showing fifteen stations of the Signal Service having the least variability of temperature; the least average cloudiness, the number of clear, fair, cloudy and rainy days at each, and the extremes of relative humidity.
32.—Table of opening and closing of navigation 1887, Signal Service stations.

APPENDIX NO. 1.

REPORT OF THE OFFICER IN CHARGE OF THE DIVISION OF MILITARY SIGNALING.

SIGNAL OFFICE, WAR DEPARTMENT,
Washington, D. C., July 31, 1888.

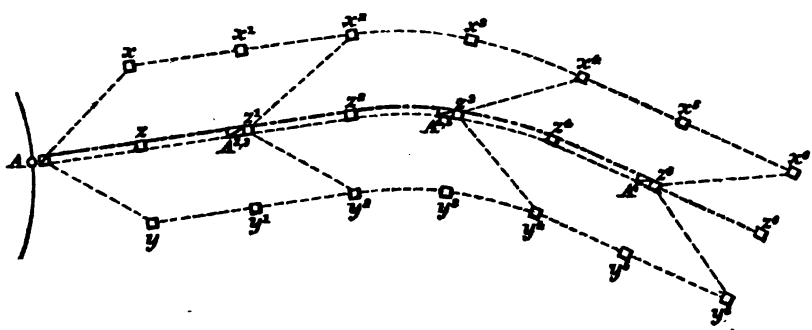
SIR: I have the honor to submit the following report of affairs pertaining to the military signaling division of the office for the year ending June 30, 1888.

Owing to the very serious curtailment of facilities for practice in signaling, consequent upon the loss of the military post heretofore at the disposal of the Chief Signal Officer for such practice, the most valuable appurtenance of the service in a military point, the field telegraph train, has lain in sheds, unused, throughout the year.

The prominent part which the telegraph is hereafter to play in war is very generally surmised, but the full measure of its importance, and the stress laid upon it by other nations, can hardly be well known in view of the enforced idleness in our own service.

There is not an army of any important power in Europe that has not well defined plans and organization for the service of its telegraphic lines of communication, but though this country was the first to make use of the field train in action, and gave the impulse to the formation of telegraph corps the world over, it is to-day behind the most of them in point of equipment, practice, and organization.

The methods of establishing and maintaining communication with and between armies differ mainly in respect to details. The general plan is practically the same in all countries, and may be briefly sketched as follows:



———————*Permanent line (general telegraph system of country.)*

— — — — — — — *Semi-permanent line.*

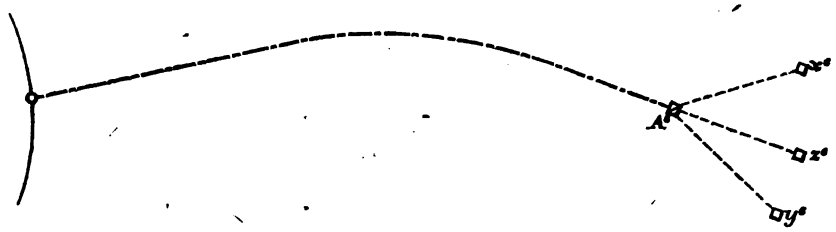
- - - - - - - - - - - - *Field line.*

Three divisions of an army are camped at x, z, and y, with headquarters in rear at A, a point upon the general telegraph system of the country.

At the end of first day the divisions are respectively at x^1, z^1, y^1, each connected by a field line with headquarters, and can communicate with each other only over station at A.

With the advance of the central division the semi-permanent line is also erected. On the eve of the second day's march it reaches z^1, establishes station, and is connected by field line with x^2, z^2, and y^2. Thus, on the third day the entire length of field lines, A, x, x^1 to x^2; A, z to z^1; and A, y, y^1 to y^2 can be taken up and used in front.

At the end of the sixth day the connection will then be as follows:



i. e., headquarters will be connected with the nearest telegraph station of the general system by a semi-permanent line, and with each division of the army by a field line.

In the face of an enemy, and at other times when necessary, communication by means of light field lines between division, brigade, and regimental commands is also contemplated as a ramification of the system.

It is the further province of the signalman to take part in reconnaissance, and by means of signals to convey intelligence so acquired; also to make use of his acquirements in the performance of outpost duty, and for observation and report from prominent advanced and flank positions. On the march signal parties invariably accompany the advance guard, rear guard, and flankers.

The signal and telegraph organizations of various nations, as a general rule, are exclusively military; but there are exceptions in which all duties pertaining to telegraph work are performed by civilians, and other cases in which the military and civilian organizations are combined.

In *England* attention to all means of communication, whether by the telegraph or the signal or other means, is entirely under the jurisdiction of the Royal Engineer Telegraph Corps, which consists of 6 officers and 245 men. Besides this corps, two companies of the Royal Engineers are always under instruction in telegraphy.

In *British India* the signal service is performed by a permanent military telegraph company. All regiments, however, receive instruction in visual signaling.

The telegraph system of the *Spanish* army was performed by civilians prior to 1876, but in that year a new regiment was formed consisting of two battalions of four companies each, two companies of which, having a strength of 4 officers and 233 men, form the field telegraph corps capable of constructing with its equipment 136 miles of line, and establishing with its personnel 96 stations of all kinds for the receipt and transmission of intelligence.

The *Belgian* field telegraph corps is likewise composed of two companies, each consisting of 4 officers and 81 men, which force, in case of war, is increased to 209 men. One of these companies has charge of the state lines, which, during war, may be taken for military purposes; the other has charge of the field telegraph.

In *Holland* the telegraph and signal corps consists of one company of the battalion of sappers and miners. This company in peace consists of 6 officers and 184 men.

The military telegraph service in *Italy* consists of six companies of the regular army and two companies of militia, each company, in time of peace, numbering 4 officers and 112 men, increased to 6 and 250, respectively, when on a war footing.

The field telegraph service in *Sweden* is conducted by a signal company numbering 4 officers and 124 men. The war footing contemplates the partition of this company into as many subdivisions as may be required, each with a strength of 1 officer and 77 men.

The field telegraph service of *Portugal* is likewise intrusted to the management of a single signal company.

The military telegraph service in *Switzerland* is performed by the engineer corps, consisting of eight battalions. In each battalion a company of two sections is devoted to telegraph and railway duty. The duties of the former section consist in establishing and maintaining field telegraph lines, of the latter in the destruction and rebuilding of railways. The personnel of a telegraph section comprises 2 officers and 38 men.

According to the proposed reorganization of the *Turkish* army in 1882, which was to consist of 13 corps, each corps was to contain 1 telegraph company.

The *Roumanian* field telegraph service is performed by 4 companies, whose duty also comprises the charge of military railways.

According to the law of 1881 regulating the organization of the *Greek* army, the telegraph duty in the field is performed by 18 civilian employés attached to the command of the army.

There is at present no regularly organized field telegraph or signal corps in *Norway*, and the duties pertaining to that branch of service are performed by the engineer brigade.

In *France* the field telegraph corps is formed at the outbreak of war. Its management is principally conducted by officials of the state telegraph. The sections of the field and mountain telegraph, and six sections of the semi-permanent telegraph, are, however, permanently organized and take part in the maneuvers of army corps. The former sections are charged with the maintenance of communication between operating bodies of troops, the latter's duties consist in connecting field lines with the state telegraph. The number of sections attached to an army depends upon the strength of the army, but each section consists of a chief, 3 chiefs of stations, 9 operators, and 26 laborers. Late information points to the possible absorption of the field telegraph service by the military, as schools of instruction for officers and enlisted men in the duties pertaining to the field telegraph have been established.

The *Austrian* military telegraph service was originally in charge of civilians, who also performed station duty, but in 1883 a regiment of railways and field telegraphs was organized. In time of peace this regiment consists of 2 battalions of 4 companies each, but for war these companies are divided into 43 sections for field and 3 sections for mountain service. Each field section comprises 1 officer and 52 men, and each mountain section 1 officer and 30 men.

At the reorganization of the *Russian* army in 1873, 7 field telegraph parks were created, each park consisting of 3 divisions, each with a strength of 1 officer and 38 men.

In *Germany* the personnel of the field telegraph service is mainly recruited from civilian employés of the state telegraph, but the charge of affairs is under direction of the military. According to the organization of 1879 the formation for war consists of 7 field, 5 reserve field, and 4 semi-permanent telegraph divisions. Each division is composed as follows: Field division, 4 officers, and 148 men; reserve division, 4 officers, and 170 men; and semi-permanent division, 4 officers, and 125 men.

Although the German telegraph corps with its mixed military and civil organization has undoubtedly rendered service of the highest character, yet it is apparent that the system does not give entire satisfaction. The general director of the state telegraph has expressed regrets that the field telegraph has not received the attention bestowed on other arms, and asks the creation of a special corps composed of 2 battalions of 4 companies each, capable in war time of mobilization into 12 field and 7 semi-permanent telegraph divisions, this military organization to have sole charge of the construction of field lines, the civilian employes of the state telegraph to do duty only upon the permanent lines.

The organization of the Signal Service in the *United States* had its incipiency in the act of June 21, 1860, which added to the staff of the Army one signal officer with the rank of major. In the earlier years of the war the field service was performed by detail of officers and men from the line, but subsequently an organization was effected under the act approved March 3, 1863, viz:

"SEC. 17. *And be it further enacted*, That the Signal Corps of the Army shall, during the present rebellion, be organized as follows: There shall be one Chief Signal Officer, a colonel, who shall be signal officer of the Army; one lieutenant-colonel; two majors, who shall be inspectors; and for each Army corps or military department there shall be one captain and as many lieutenants, not exceeding eight, as the President may deem necessary, to be appointed by the President, by and with the advice and consent of the Senate, who shall receive the pay and emoluments of cavalry officers of similar grades; and for each officer of the Signal Corps there may be enlisted or detailed one sergeant and six privates, who shall receive the pay of similar grades of engineer soldiers: *Provided*, That no officer or enlisted man shall be allowed to serve in the Signal Corps until he shall have been examined and approved by a military board, to be convened for that purpose by the Secretary of War."

The corps thus established was concerned only in operations in the field, the charge of the semi-permanent military lines being entrusted to a mixed civil and military contingent, both organizations being discontinued at the termination of the war.

Later a Chief Signal Officer with the rank of colonel (subsequently general) was appointed under the act of July 28, 1866; the act also providing for the detail of 6 officers and not to exceed 100 men from the Battalion of Engineers. This law, however, from some cause, seems to have been inoperative as regards details from the engineers, the duties having fallen to line officers and men.

In 1870 the duties of the Weather Bureau were placed in charge of the Signal Corps. The requirements of this Bureau were such as to absorb the greater part of the energies of the organization, and practically relegated its military functions to a secondary place; and although 16 lieutenants have been added and the enlisted force augmented, the military duties are still in abeyance, and now that facilities are no longer afforded for obtaining practical experience with the telegraph train and appliances generally, the necessity for action in favor of the military features of the corps seems imperative.

During the year a number of *heliographs* of recent models have been procured and, together with the patterns already on hand, have been scrutinized by a board detailed to

determine the composition of an instrument best suited to our service. The board consisted of—

Capt. F. C. Grugan, Second Artillery, the inventor of the heliograph which bears his name, and which has been received so favorably by the Army heretofore;

Lieut. M. P. Maus, First Infantry, an officer of experience in the practical use of the instrument on the Southwestern frontier; and

Lieut. Frank Greene, Signal Corps.

The board in its report says:

"No instrument, either examined or described, could be found suitable for the needs of our military service. The movable mirror system with key attachment for signaling is decidedly objectionable, as well as the system that permits the use of a screen mounted upon the same base as the mirror, for these arrangements interfere greatly with successful signaling.

"It is a matter of the first importance to preserve the stability of the mirrors when in position, especially for long-range work; in order to obtain this stability the board decided to adopt the fixed flash system.

"This decision disposed of the Mance and Garner heliographs, both of which are made on the movable flash system.

"The Begbie, Grugan, and Pursell instruments are approved as to the system employed, but in the details of construction there exist defects which should be corrected.

"The Finley helio-telegraph was thoroughly tested by the board at the request of the Chief Signal Officer and was found defective in principle, it being impossible to separate the flashes, and consequently the dots of the code could not be distinguished from the dashes; the vibration of the mirrors, while working, seriously impairs its efficiency even at ordinary range. Its weight, its complicated nature, its cost, and its defective principle unfit it for the service.

"After a careful consideration of the subject and in order to carry out the object for which the board was convened, it was decided necessary to construct an instrument which would be as described below:

"(1) On the fixed flash system.

"(2) Simple, strong, and of as few parts as possible.

"(3) Of reasonable weight.

"(4) With all like parts interchangeable.

"(5) With mirrors of a size not less than 4½ inches square.

"(6) Capable of being accurately sighted and adjusted.

"(7) Stable in position when in use.

"(8) The screen mounted on a separate tripod."

In addition to the detailed specifications and drawings submitted with its report, the board caused two instruments to be constructed under its supervision to serve as models, and these models were tested at various ranges up to 35 miles in varying conditions of the atmosphere with most satisfactory results, and the opinion is expressed that in a clear atmosphere this heliograph can be read with the naked eye a distance of 50 or 60 miles, and under exceptionally favorable conditions over longer ranges.

The board is also of opinion that for permanent stations a larger mirror is often desirable, and recommends as satisfactory the model of the field instrument, omitting the tripods. It is intended that the mirrors, bar, etc., be packed in a wooden box, and in setting up the instrument for work it be attached to the stump of a tree or post or some firm base by means of screws specially provided for the purpose.

The importance of great care in the selection of mirrors is emphasized, and in order that defects may be detected the test is proposed of throwing the image of the sun upon a screen or blank wall at a distance of one hundred or more feet, and carefully examining it. The objectionable mirror—that is, one which is not uniform in composition and silvering, and both of whose surfaces are not true planes and parallel—will give an irregular, distorted image, the result of the dispersion of the rays.

The only mirror which can be satisfactorily used for the heliograph is one giving "a circular disk of light of equal intensity, irrespective of the shape of the mirror."

The square mirror was adopted instead of the circular, as it gives about one-fourth more reflecting surface for the same packing space.

The tripod legs and mirror bar are somewhat heavier than heretofore used, but the increased weight is fairly offset by the gain in rigidity and strength, and the division of the parts into two packages weighing, respectively, 6¼ and 7⅝ pounds makes the instrument easily portable.

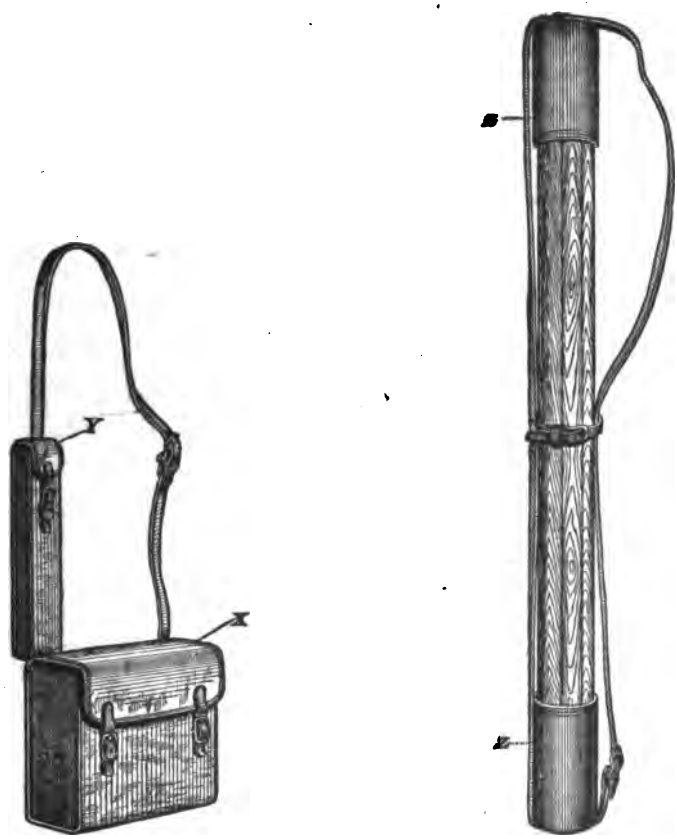
The mirrors (encased in a light wooden box as a precaution against breakage), screen, and sighting-rod are carried in a pouch to be slung across the shoulder. The mirror-bar is contained in a smaller pouch attached by loops to the strap of the larger.

The tripods of the heliograph and screen are provided with a hook for the attachment of a weight in case of necessity; they nest closely as a compact cylinder, and are packed for carriage in a skeleton case of leather.

The different pieces of the instrument are required to be made with such care that like parts shall be interchangeable, and provision is made that spare parts shall be on hand at the depot.

U. S. Signal Service heliograph.

FIG. 1.



(Heliograph equipment pouch.)

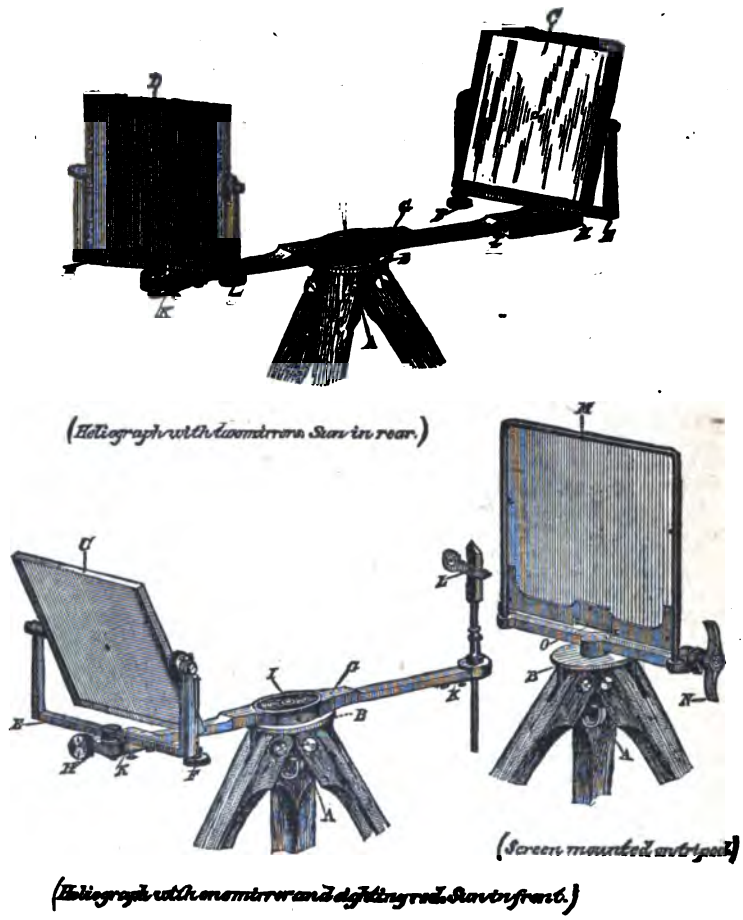
X. A sole-leather pouch, containing:
One sun mirror. } Enclosed in a wooden box.
One station mirror. }
One screen. One sighting rod. One screwdriver.
Y. A smaller pouch, sliding by two loops upon the strap of the larger, containing: One mirror bar.
Z. A skeleton case containing: Two tripods.

In the handling of this instrument, care should be taken to prevent unnecessary wear and tear of the tangent screws, upon which so much depends in adjustment. It frequently happens that attempt is made through inadvertence to turn the mirrors without recourse to the screws, thereby doing violence to the integrity of the threads. This is the most important source of the complaints heretofore made that adjustment screws fail to work with sufficient reliability.

One mirror is used when the sun is in front of the sender, or in such a position that the light strikes the mirror at an angle of 120 degrees, or less, with a right line drawn from the sending to the receiving station. If the distance is very great to the distant station two mirrors should be used when this angle is over 100 degrees.

U. S. Signal Service heliograph.

FIG. 2.



A. Tripod.
B. Tripod head.
C. Sun mirror.
D. Station mirror.
E. Mirror supports.
F. Tangent screw for revolving mirror about horizontal axis.
G. Mirror bar.
H. Tangent screw with ball-bearings for revolving mirror about vertical axis.
I. Clamp screw for attaching mirror bar to tripod.
K. Spring for clamping mirrors and sighting-rod.
L. Sighting-rod with movable disk.
M. Screen.
N. Key for screen.
O. Screen spring.

TO SIGNAL WITH ONE MIRROR.

Set the tripod firmly on the ground; attach the bar to the tripod, clamp the sun mirror to the bar and insert the sighting-rod with its disk turned down, and, sighting through the center of the mirror, move the bar and raise or lower the sighting-rod until its point accurately covers the distant station; then clamp the bar, being careful not to disarrange the alignment. Turn up the disk on sighting-rod.

Move the mirror by means of its slow motion screws until the shadow spot falls upon the disk of the sighting-rod. The flash will then be visible at the distant station. The shadow spot must be kept in the center of the disk while signaling.

Place the screen, clamped on its tripod, close to and in front of the sighting-disk, so as to intercept the flash. Working the screen will cause the flash to appear and disappear to the distant observer.

TO SIGNAL WITH TWO MIRRORS.

The signalman must consider now how the sun strikes the sun mirror, and how it is reflected from the station mirror to the distant station. He can nearly adjust the instrument by fixing the mirror without sighting.

Set the tripod firmly on the ground; attach the bar to the tripod; clamp both mirrors to the bar. Place the bar diagonally across the line of vision to the distant station, the station mirror facing the distant station, the sun mirror facing the sun, placed in the socket which has the tangent screw attached. Clamp the bar. Stooping down, the head in rear of and near the station mirror, turn the sun mirror by means of the slow-motion screws until the whole of the station mirror is seen reflected in the sun mirror, and the unsilvered spot and paper disk accurately cover each other.

Still looking in the sun mirror, turn the station mirror until the distant station is brought into position, such that the reflected disk, the unsilvered spot, and the reflection of the distant station are accurately in line, or cover each other; after this the station mirror must not be touched.

Now, stepping behind the sun mirror, throw upon the station mirror a full flash, and adjust the sun mirror until the shadow spot falls upon the center of the paper disk. The flash will then be visible at the distant station.

The shadow spot must be kept in the center of the paper disk while signaling.

Place the screen, clamped on its tripod, so as to intercept the flash, and in a convenient position for keeping the sun mirror adjusted.

In obtaining a supply of these instruments the question of cost enters very materially, in view of the extremely limited amount appropriated for the purpose and the number of instruments required. It appears probable that future bids may be somewhat reduced from the lowest obtained this year, as more ample time can be allowed the manufacturers for examination of details.

One hundred have been ordered at a total cost of $4,205, and this order, which will provide for the supply of 50 out of the 116 posts required to practice with the instrument, was made practicable only by reason of the deficiency appropriation.

HOMING PIGEONS.

A station has been established at Key West during the year for experiment with the homing pigeon as a dispatch bearer.

The position of the island with respect to the possessions of other powers is not without advantage, and communication from the ships of a squadron cruising in the neighboring waters may oftentimes be desirable, and on several accounts the locality selected is convenient.

At the outset of the undertaking the favorable consideration of the Secretary of War made available one of the unoccupied storehouses at Key West Barracks, which has been converted into a cote upon approved plans and equipped with the necessary appliances for the care and training of the birds, such as nest pans, homing baskets, including attached tin cups for food and water, perches, drinking fountains, bath-tubs, bracelets (for attachment to the leg for identification), rubber stamps (for marking wings), mating-cages, catch nets, appliances for attachment of and protection to messages, such as quills, fine copper wire, sewing-silk, needles of various sizes, awls, and beeswax; also miscellaneous tools, food supply for the year, including Canada peas, small corn, vetches, hempseed, flaxseed, oatmeal grits, cracked wheat, rock and common salt; also tobacco stems for nests, and water barrels.

As the water supply at Key West is dependent on rainfall, it has also been necessary to incur a slight expense for this requisite.

The most important items in the equipment of the loft, the birds themselves, have been provided by the liberality of breeders, and it is probable that in no other way save through the good will of those most interested in the achievement of these birds, could the loft have been stocked to such great advantage. It now contains young birds of the most approved strains donated by members of various associations, and, as the bird is quite prolific, it seems assured that from this time forward there will be no lack of material in this respect.

The following is an extract from regulations governing at the loft:

"The register will contain a list of the birds by number, their age, sex, color, distinguishing marks and parentage, and set forth in detail the history of each, with stone as to achievements and capabilities.

"In the care of the birds due regard will be paid to cleanliness and ventilation; they will be fed at stated hours, in deference to their regular habits, and the fountains and bath-tubs will be frequently cleaned and supplied with wholesome water, a measure of vital importance to the health of the pigeons.

"It is not designed that great speed be developed, or exceptional flights be undertaken at the expense of hardiness and reliability, and it must always be kept in view that the chief merit of the bird for military purposes lies in the direction of its service as a messenger. Breeding and training will therefore be mainly directed to the production and development of the most resolute homing qualities.

"As it does not appear that the homing pigeon has well recognized points of color that will assist in breeding for special traits, that much importance attaches to the form and size of the bird, provided there be sufficient length and strength of wing, or that the shape of the head is material, provided there be ample development for brain room, these features may, at first, be safely disregarded in mating for results; but as experience is gained, advantage should be taken of all points believed from observation to go hand in hand with valuable characteristics.

"The eye, however, seems worthy of special attention as indicating the degree of intelligence and of persistence in face of difficulties.

"The crossing of different stocks becomes a necessity that lack of constitution, strength, and intelligence may not result, as also that by judicious mating the qualities most desired may be combined and reproduced, possibly improved. In this connection, however, it is the opinion of those well qualified to judge that birds bearing kinship nearer than that of second cousin can not be paired to advantage.

"The gradual training of the birds will begin as soon as practicable after they attain sufficient strength for the first short flights. (Old birds from other lofts, and which are provided solely for breeding purposes, will be kept in restraint, as their liberation implies their loss.) They will be made familiar with the appearance of the island from different directions, but the further training and ultimate result will contemplate the invariable employment of the same birds over practically the same course, and special care will therefore be exercised to identify birds trained to different directions. Thus the mark 'N' will indicate that the bird bearing it is trained to return from the north (embracing the full quadrant from northwest to northeast), and similarly for east, south, and west. The number of birds composing each group will depend on the necessities of the service in the several directions.

"In sending out birds for training flights, sufficient food (small corn, Canada peas, or wheat, etc.) will be fastened to the basket by sack or otherwise to insure a supply for the utmost limit of time till their liberation, and each basket will be tagged with instructions as to feeding and bear a notice conspicuously placed that the birds should at all times have access to a plentiful supply of fresh drinking water. Also that unless their retention aboard ship is apt to carry them beyond reasonable limits, they be not liberated before sunrise or during very stormy weather.

"In regard to these latter points it may be remarked that successful flights have been made during storms of wind and rain, and even during the night; but experiments to test the hardiness of the birds under these unfavorable conditions will be made only after the satisfactory demonstration of their reliability and usefulness by daylight in ordinarily favorable weather.

"Entrance to an ante-room of the loft by a trap-door is contemplated, that the birds may be kept imprisoned till the message is detached. Until such is provided a substitute may be improvised by requiring the birds to raise a pair of wires hung from a staple at the top, which swing in freely, but falling back against a ledge prevent egress.

"Whether the tenacity with which the pigeon seeks its loft after liberation is due to affection for mate and young, or whether it is due to attachment to its home, perch, and nest, it is certain the bird has strong proprietary instincts and dislike of change. All possible deference should be paid to this trait in its character. No bird will therefore be forced to vacate the nest and perch originally assigned it, except for the most urgent reasons.

"A number corresponding to that of the bird in the register will be so placed with reference to the nest and perch as to indicate the proprietorship.

"The birds will be identified by the leg-band, but should bear the service-stamp on the under side of a suitable wing-feather.

"The young birds in their first season may be trained to return home from a distance of 100 miles; in the second season this distance should be somewhat increased; but for the third and subsequent years a return from 400 miles can be accomplished with much certainty unless the weather is so bad as to make flying impossible. It is believed that the question of seasons will not affect the flights materially at Key West, but that throughout the year the birds may be kept in training and be available at any moment for messenger service.

"That the birds may become accustomed to the carriage of the message-roll and the chance of loss from picking at the parcel be reduced to the minimum, it will be established as a general rule that the quill intended as the envelope for the protection of he message shall form the habitual equipment of the bird in all its flights, and the methods of attaching the quill and securing the safe transmission of the message will be made the subject of inquiry and practice till the most suitable is definitely determined.

"An approved practice abroad is to roll and insert the message slip in the quill, closing the ends of the latter with sealing wax, and piercing near the ends with a red hot steel point, so as not to split, threading the pierced holes with waxed silk thread or fine copper wire, and attaching to the principal tail feather. This feather should be tested by a slight pull to see that it is solid.

"Advantage will be taken of the opportunity offered by ready access to the meterological records of the station to determine as definitely as possible to what extent the speed and reliability of the birds are affected by various atmospheric conditions, such as haze, fog, clouds, wind (direction and velocity), pressure, temperature, and humidity; in fact, careful note will be made of all causes that operate to prevent or delay the return of the birds to the loft, including the ravages of the hawks; and, that no less may inadvertly occur through actions of gunners, the residents of the island will be informed that their co-operation to prevent such loss is invited in behalf of the public service, * * * and generally, it is made a duty in connection with the maintenance of the station that the most approved methods be employed of handling and caring for homing pigeons, and adapting them to the carriage of messages under all conditions likely to arise where benefit in a military point might result."

The following chapter in the history of the messenger pigeon which records its services to the French during the siege of Paris is taken from the interesting paper of Capt. H. T. W. Allatt, of the English army:

"It became evident, immediately after the capitulation of Sedan, that the French capital would shortly be invested. There existed in France at that time several pigeon-flying societies, some in Paris and some in the provinces. These societies were well aware of the use that could be made of their birds in case of siege. On the 2d September, 1870, an eminent ornithologist wrote to the minister of war, suggesting that all trained pigeons belonging to Paris should at once be collected and sent into the provinces, while as many as possible should be got into Paris from different parts of France. On the following day, however, the Imperial Government was upset, and no notice was taken of the letter. When the Germans arrived under the walls of Paris, not a single pigeon had been sent out of the capital. On 23d September the first balloon left Paris, carrying a large number of official and private documents. There was no means of ascertaining whether the balloon had landed safely and clear of the enemy. The next balloon that started with dispatches also carried out three pigeons, and in the evening of the same day the birds had returned with the message, 'We landed safely at Vernouillet, near Triel. We will take official dispatches to Tours. Bags of letters will be distributed.' This was the first message that reached Paris after the arrival of the Germans. The Parisians, the large majority of whom had never before heard of the capabilities of pigeons, were amazed at this unexpected success. The illustrated papers were filled with drawings of the wonderful messengers, and printed fabulous tales of their performances. Nearly every balloon that left the capital after this date carried out pigeons, which were dispatched to Tours and placed under the exclusive charge of Government officials. Pigeons began to be collected at Tours from the beginning of October, from which date they were regularly employed as messengers into Paris. It was not, however, till the 4th November, by which time 115 birds had already been used, that the advantages of the pigeon post were opened to the public. On that day the delegation of Tours issued a decree to this effect: 'Considering that since the investment of Paris there has been established, through the agency of the double service of telegraphs and posts, by means of balloons leaving Paris and of messenger pigeons leaving Tours, a special interchange of correspondence destined to supplement between Tours and Paris the ordinary means of communication, which for the time being are interrupted * * *. Every person residing within the Republic is permitted to correspond with Paris by means of the messenger pigeons belonging to the administration of telegraphs and posts, the charge to be 50 centimes per word.' This charge was eventually reduced to 20 centimes, and a system of reply cards was introduced, and a post-office order service established.

"At first the dispatches carried by the birds were written by hand on small pieces of very thin paper and on one side only. This is the most simple and primitive method, and was in operation till about the middle of October. It was, however, long and toilsome, and quite unsuited to the transmission of the enormous number of dispatches which had to be sent into Paris. Each dispatch had to be copied several times, and errors often crept in. It was then suggested that the size of the dispatches be reduced by photography, and thus at the same time secure a large number of copies without risk

of error. The dispatches were accordingly first copied in handwriting in large characters, then pasted one under the other upon large sheets of cardboard. These large sheets were then fixed to wooden panels about 2 feet by 3½ feet, and the panels, covered with two or three columns of messages, were photographed and reducee to 1½ inches by 2½ inches, a reduction of one three-hundredth in surface. The photographs were on very thin paper and on one side only. They were checked under a microscope before being confided to the pigeon.

"Amongst the dispatches were several cuttings of the Moniteur newspaper, which at once demonstrated how much more considerable the reduction would be if all the dispatches were printed before being photographed. The next step in advance was therefore to set up the dispatches in type, and to photograph them on each side of the small paper messages. Shortly after, a still greater reduction in surface and weight was effected by photographing messages on a very thin film of collodion, each film or pellicle containing on an average 2,500 dispatches. One bird could easily carry a dozen of these pellicles, making 30,000 dispatches. Sometimes this number was exceeded. For instance, a pigeon which arrived in Paris on the 3d February carried eighteen pellicles, which contained 40,000 messages, most of them private. This was the largest number carried.

"The Bulletin de la Reunion des Officiers (11th July, 1885) states that 150,000 official dispatches and 1,000,000 private dispatches or notices of money-orders were carried by pigeons into Paris. These messages if copied in ordinary writing would fill 500 library volumes.

"The first dispatches which arrived in Paris were, as we have seen, written by hand. They were read by the naked eye or with the assistance of a microscope. To these succeeded the photographic ones on paper, to decipher which a powerful microscope was essential. When, however, the collodian pellicles began to arrive, a more rapid means of reading them was adopted. Being transparent, they were placed between two pieces of glass put into a species of electric magic-lantern, and the writing was thrown in large, legible characters on a screen or wall. This was copied by several clerks at once, each taking one column of writing, and in this manner the transcription and sending out of the messages were rapidly accomplished."

The organization of regular "military pigeon systems" in almost every continental nation of Europe soon followed the Franco-German war.

The frontier fortresses, especially those that are considered most liable to attack, and a large number of inland towns, both open and fortified, are provided with pigeon-lofts. An important point in the interior of the country--usually the capital—is selected as a central station with which all other stations are to communicate. There is often also direct communication between fortresses. When the distance separating outlying stations from the central one is considered too great, the connection is insured by means of intermediate ones. It is also sometimes convenient to resort to this last arrangement in order to reduce the number of birds that must be kept.

The military budget of *France* assigns a credit of $20,000 for the annual cost of signaling and pigeon-lofts. In accordance with law the military authorities have also the right to requisition messenger pigeons, and the President consequently directed that once a year a census be made of all messenger pigeons; the lists are to be made out under the orders of the mayors, upon the obligatory declaration of the proprietors of the birds, failing which an official inspection of any loft may be made. A recent article in a French military paper on their pigeon system concludes thus:

"In a word, all dispositions are made, so that, when a new war breaks out, the service of messenger pigeons will not have to be improvised as in 1870. An exchange of correspondence between the central authority, the governors of fortresses and intrenched camps, and the commanders of armies is insured."

The *Germans* recognized at once the importance of the services that pigeons rendered to their adversaries during the siege of Paris, and were one of the first nations that established military lofts; they have provided for communication between different parts of the Empire by such judicious distribution of the stations that now their system is by far the most extensive and complete in Europe.

The annual credit in the military budget for pigeons and visual signaling is $8,500.

The *Austrian* pigeon service is much less complete than that of Germany. The military authorities, however, appreciate the usefulness of pigeons as messengers in mountainous country where the electric telegraph might not be able to keep pace with the troops, or where detachments have no other methods of communication.

Russia places such dependence upon the system that the sum annually devoted for the maintenance of pigeon communications is said to be $10,000. This nation has experimented in the use of pigeons in tactical operations where a turning force or detachment may be without communication with the main body. Such a case might readily occur through the nature of the country not admitting of the sufficiently rapid laying of a tel-

egraph wire, or through the removal by the enemy of part of the wire which under such circumstances is usually dangerously exposed. In such case, the birds from the detachment return to their loft, which should be the one nearest headquarters. The messages would then be transmitted to the general commanding by telegraph. These tactical experiments are said to have been carried out successfully during grand maneuvers of the army, and this method of communicating will be likely to be introduced in that country among the irregular cavalry for reconnoitering service in front of the army.

Italy has an extensive military pigeon system. The lofts on the coast are required to train their birds out to sea, with a view to their employment as messengers from the cruisers off the coast.

The *Spanish* Government has likewise established pigeon-lofts at various coast-guard stations, the idea being to employ the birds to communicate between different stations, and also between the shore and naval cruisers, which, in war time, would be employed to intercept the enemy's ships, and, in peace time, to stop smuggling.

Other countries have given attention to this system of communication. *Belgium* especially has brought pigeon flying to the highest state of perfection.

Private pigeon flying clubs under the fostering care of the war ministers have within the past twelve years also enormously increased in every part of the continent of Europe. In Germany there are at present some 350 such societies, while in France the number may be estimated at 300. The greater number of these fly their birds in directions fixed by the war minister, who gives prizes for many of the races. The military authorities can therefore rely upon the services of many thousand privately trained birds to supplement the work required of the military lofts.

In procuring *field-glasses* during the past year an unusual interest was developed among makers and importers. The terms of the proposal practically set forth that the best glass for military purposes was desired, and thirty-eight different specimens were submitted. The most satisfactory, all things considered, was a "Lemaire," with a power approximating 7. This power is of course attained at an expense of field, but the diminution of light and field is more than offset by the increased range and definition. Although this glass is in some respects an improvement over the old ones, especially in point of power, it is yet quite evident that a further examination of the principles involved will enable the office to give details and specifications upon which a better instrument may be constructed. For instance, the glass which gives the best results on a dark day, or in fading light, is one of low power with extensive field, whereas in bright weather the higher the power within practical limits the more satisfactory the glass. Also, it is observed that there is much difference in the size of glasses of the same power submitted by different makers, and as portability is an exceedingly desirable attribute, it is evident that the determination of the minimum weight and size for a fixed power is possible.

The examination of a large number of glasses makes evident the probability that the distance between the eyes of the average American is somewhat less than that of the European. This assumption is based on the fact that most of the foreign glasses are constructed with such pupillary distance that, as a rule, it is rare to find a glass with a fixed arrangement of tubes suited to the width between the eyes. This apparent difference has also been noted by officers of the Naval Observatory, and in their specification of the field-glass, account of it has been taken as applied to individual characteristics by the insertion of a joint in the branches, so that the coincidence of the centers of the lenses and of the eyes is made solely dependent on adjustment. The conclusion is also reached after much consideration and after consultation with officers of the Naval Observatory, that it should be possible by simple adjustment, to change power and field at will, thus making the same glass serve a double purpose.

Binocular telescopes have received but scant consideration this year; they are such expensive instruments that the appropriation does not warrant further experiment in this direction at present.

Notwithstanding persistent effort to secure an entirely satisfactory *lantern* for night signaling, but little, if any, progress has been made beyond the point attained last year. It is in point of power that the great lack is felt, and how to obtain this without sacrifice of portability appears to be the chief trouble. Other matters also, such as the excessive heating up of the metal parts and the maintenance of a steady flame under all conditions of wind and weather, add their mite to the difficulty. It is very desirable that the interest of inventors should be stimulated to the production of some variety of light which may be used at night over ranges approximating those of the heliograph by day, as the completion of the equipment is meanwhile in abeyance and the issue of the manual delayed.

Rockets, *bombs*, *lights*, and *minor signals* have received but little attention, nor have any endeavors been made to experiment with a view to the improvement of signal towers and ladders.

For the purposes of a portable observatory, however, the balloon has somewhat come to the fore abroad, and specifications have been received of a recent equipment whereby the entire paraphernalia, balloon, gas generator, and tackle for handling, is transported on a light train of three wagons.

Many books, papers, reports, etc., containing information on the field telegraph and signal corps of other countries, and which were obtained through the courtesy of the State Department, are on file. The most important have been translated for convenience of reference.

The regenerative *dry element*, procured from abroad in the hope of finding a portable substitute for the acid cell in the Eccard field telephone, is a disappointment. At first blush it promised well enough, but its length of life and durability are too limited to meet the case. There is something in the composition which has a decided affinity for the metal coating, and the destruction of the outer shell is accomplished in a relatively short time. There are, however, other dry batteries pushing for recognition, and it seems probable that eventually one of them may be able to satisfactorily establish a claim to possession of the advantages conceded to the Le Clanche without its attendant deficiencies.

For military purposes it is desirable that the glass jar be supplanted by a more durable vessel, that the necessity for occasional renewal of the battery be obviated, or better still, that such moisture as may be necessary shall be contained in combination, and not as a free liquid; that the battery be practically independent of temperature, and that it work in open circuit for at least the same length of time as the Le Clanche, and with quite as constant a current.

The Gassner is an element claiming these advantages, and a few of the cells are now undergoing test to determine the merits.

A *cable* submitted for test as to insulation resistance and durability, and for which great superiority was claimed, failed in several essential particulars. For the present, therefore, the dependence in this respect for light field lines must be placed upon the excellent foreign double conductor, or the fair substitute manufactured in this country, as mentioned in previous report.

Instruction and practice in signaling continued at military posts under existing orders. From reports received, the minimum number of officers under instruction during any one month is 12, against 14 during the preceding year, and the maximum 65, against 51; while the minimum and maximum numbers of enlisted men who received instruction, as compared with those of the preceding year, are 392 and 727 respectively, against 433 and 686.

Theoretical and practical instructions in field telegraphy and signaling are embraced in the courses of instruction at West Point and Fort Leavenworth.

In the Department of Arizona, post commanders were directed by General Miles to occupy their districts of observation by the location of outposts, signal and heliograph stations, and to establish communication with the nearest signal station of the adjacent post.

During the practice marches in the Departments of the Platte and Columbia signaling is contemplated for establishing communication between the different bodies of troops.

At Vancouver Barracks signalmen were employed in skirmish target practice, transmitting intelligence to and from target-butts and firing-stands.

At Fort Monroe signal practice was had in connection with artillery target practice.

For a considerable period the guard at Fort Barrancas held daily communication with that at Fort Pickens by means of signals.

The detachment under instruction at Fort Columbus practiced signaling to and from Bedloe's and Governor's Islands.

During the encampment of the First Infantry at Santa Cruz, Cal., fifteen lieutenants of the regiment held signal practice with flag, torch, flash lantern, and heliograph.

Lieut. Theodore Mosher, Twenty-Second Infantry, established heliographic communication from Fort Lewis, Colo., with troops in the Blue Mountains, Utah, a distance of approximately 75 miles.

The troops at Huachuca effected heliographic communication over ranges varying from 35 to 40 miles.

Those at Fort Lowell established communication by heliograph with Rincon Mountain, a distance of 20 miles.

The heliograph is also used for communication between Pike's Peak and the base of the mountain.

Attempts were made at Fort Assinaboine to open communication by heliograph with troops in Sweet Grass Hills (75 miles). Faint flashes were seen, but the effort to communicate failed, because of the insufficient size of the mirrors employed.

In regard to existing orders under which instruction in signaling is held throughout the Army, it is believed that a modification thereof could be made to advantage. It is

now required that at least one officer and three enlisted men at each military post be kept constantly under instruction and practice in signaling until the officers and all men who have sufficient intelligence are proficient. The effect of this, as appears from numerous reports, is to cause such conflict with existing requirements in respect to other duties that strict compliance with the order is impracticable, the majority of reports during the active rifle practice seasons and during severe winter months at northern stations bearing remark of "no practice," and setting forth the reasons therefor as above.

In the Department of Dakota the severity of the winter months reduces the outdoor instruction to a minimum; whereas in Texas and Arizona the reverse obtains.

It is observed that, as a rule, the months of March and April seem to afford the best opportunity for instruction, as applied to the whole country, and a modification of the order, so as to require the devotion of a detachment to signaling through one or both of these months, it is believed, would concentrate interest and operate more advantageously than the present method, or it would be better still if authority were given department commanders to designate the season of practice for the troops of their command.

Supply.—During the year 119 requisitions for signal equipments and stores have been received and acted upon.

As far as practicable all supplies requested have been furnished, but in respect to target range equipments and heliographs lack of funds has seriously interfered with the endeavor to keep abreast of the demand.

In urgent cases, for use of troops in the field, heliographs have been provided by transfer from other departments, but the practice of stripping one command to equip another does not commend itself and it is hoped that sufficient means may be provided hereafter to make such course unnecessary.

As to ranges, out of 59 posts designated by the inspector of rifle practice it was possible to equip but 19 more or less satisfactorily. These, in addition to the posts previously supplied, make a total of 39 with telephonic communication between the butt and firing stand.

For the balance, nothing could be done beyond proposing the substitution of telegraph instruments or call-boxes in lieu of telephones.

The *militia* of late years has taken unusual interest in signaling, as evinced by applications for information and material. California, Colorado, Connecticut, Iowa, New Jersey, New York, Oregon, Pennsylvania, Vermont, and Wisconsin are on record as giving particular attention to the subject, and the formation of various signal commands is noted, either as signal companies or telegraph corps, both styles of organization presumably contemplating the use of the wire as well as that of visual signals.

The benefits that will result to the militia from attention to its own means of communication are obvious, and aid has been freely extended, that their methods and equipments may closely follow those of the Army. Information as to organization, practice, etc., has been supplemented by sending out code cards, manuals, cipher disks, reports, and forms, but it has not been found practicable under the law to make issue of the regulation equipments and stores, although such issues would seem to be directly in line with the policy in respect to ordnance, and would go far towards fostering and stimulating their efforts to produce practical working organizations.

In respect to a single article of the equipment, the field-glass, it is plain to see the advantage resulting from the aid of the Government. Glasses of foreign make (admittedly the best) are relatively inexpensive in Europe and quite the reverse if purchased at home; but, in consideration of the service to be expected of the militia, it does not seem unreasonable that they should be allowed the importation of their field-glasses (and for that matter any other article of the equipment that can not be obtained in this country) duty free; but, better still, as proposed, that they be obtained by the Government and issued outright.

On behalf of the regiment of the Oregon National Guard, an urgent appeal was made that the simplest kits and apparatus might be issued to enable the men detailed for signal duty to obtain elementary practice, as they were without funds for the purpose; but notwithstanding the evident desire on the part of all concerned to find a way of making the equipments available, it could not apparently be done without warrant of law. Similar requests have been received from other States, but it seems only possible to tell what to do and how to do it, without providing the means.

In New York the State law provides for a signal establishment within the National Guard, by the act passed May 12, 1885, as follows:

"PAR. 17. In the discretion of the commander-in-chief, and under such regulations as he may prescribe, there shall be attached to each division of the National Guard a signal and telegraph corps, and such corps may be attached to each of the division headquarters or to the headquarters of one of the brigades composing such division. The said

corps shall consist, if attached to a division headquarters, of one chief signal officer with the rank of major, and one signal officer with the rank of captain; and if attached to a brigade headquarters, of one signal officer with the rank of captain, and likewise such non-commissioned officers and privates, not to exceed thirty, who may be specially enlisted into such corps or transferred thereto from the several organizations of the division or brigade for such instruction or service. The number of non-commissioned officers for said corps shall be at the discretion of the division or brigade commander, but shall not exceed six in number, two of whom shall be warranted as signal sergeants and the others as signal corporals by the commandant of the division or brigade to which they are attached."

It is thus seen that this State, by providing for the organization of this branch of the service, is in advance of the General Government.

Great interest in signal practice has apparently been developed by the action of General Molineux in offering a medal to the best signalman, and in the contest for the prize won by Private Charles W. Blackburne, of the signal and telegraph corps of the second brigade, the percentages of accuracy in rapid sending and receiving of the four leading men fell but little short of perfection, ranging from 99.84 to 99.35. Such work as this in preliminary practice implies results of the highest order on actual station in the fields.

Officers of the militia have expressed a desire to ascertain as to the standard speed in signaling. The rate is dependent upon so many conditions that no attempt is now made to urge a speed beyond which accuracy in receiving is liable to impairment. With the 4-foot flag a rate of seven or eight words per minute is considered excellent; but this speed is somewhat beyond that which can be reasonably expected under usual conditions, and the day's work of a signal party rarely averages more than three words a minute. The rate with a smaller flag is of course greater. With the heliograph the rate for several hours has been maintained as high as four words per minute, while for a single message it has frequently exceeded ten words. It is considered advisable to instruct the men in sending and receiving with the wand at as high a rate as possible. This operates as a test of their readiness with the alphabet; but in swinging the flag physical conditions can usually be relied on to determine the rate.

The benefit of the touch of elbow between the militia and Army is already so apparent in other respects that the application of rules that relate to instruction and inspection by officers of the Army could undoubtedly be extended with advantage to include the subject of signaling.

Lieut. R. B. Watkins, Signal Corps, was temporarily in charge of the division during the month of September.

Very respectfully, your obedient servant,

R. E. THOMPSON,
First Lieutenant, Sixth Infantry, Acting Signal Officer.

The CHIEF SIGNAL OFFICER, *U. S. Army.*

APPENDIX NO. 2.

REPORT OF OFFICER IN CHARGE OF VERIFICATIONS OF INDICATIONS.

SIGNAL OFFICE, WAR DEPARTMENT,
Washington City, August 4, 1888.

SIR: I have the honor to submit herewith a report of the verifications of indications for the year ending June 31, 1888, as follows:

In accordance with instructions I assumed charge of this work January 1, 1888. The regular daily indications issued at 10 p. m. have been verified for weather, wind (force and direction), and temperature, and the percentages of justification of wind and cold-wave signals determined.

The detailed results have been published in the current numbers of the Monthly Weather Review.

While the rules guiding the official in marking predictions are sufficiently definite and explicit for most cases, yet the percentages are in many respects a matter of judgment on his part, and for this reason vary as determined by different persons. The verifications for the six months preceding January 1, 1888, having been determined respectively by different officers, it was considered advisable to re-mark these months in order that their percentages and those for the remaining half of the year might be determined on the same basis. The marking of predictions of wind was omitted from this revision, partly on account of the large amount of time required, and its weight in the general average being small, only one-tenth, it was not considered necessary. One exception to this was made in the case of the predictions for the Pacific coast for September, 1887, which were verified for direction only, the force of the wind being omitted from the predictions owing to some delay in receipt of order requiring wind force to be included in the regular indications. (In order that the percentage for wind for this month may correspond with those that follow, it should be combined with, say, the mean percentage attained in subsequent months for predictions of wind force, and which it is presumed will be about 90 or somewhat higher. This quantity is not readily obtained from the records, as the combination with directions is made as the work of verifying progresses, but it is still attainable and may be supplied. At the same time all predictions for July and August were for direction only, so that September for Pacific coast is not different in this respect from those months.)

The following table gives the yearly averages by elements for predictions for the eight years ending June 31, 1888, for districts east of the Rocky Mountains, Minnesota and Dakota excepted, from November, 1887, to March, 1888, inclusive:

[Extract from Table I.]

Average percentages of indications officials for the eight years ending June 30, 1888.

Name.	No. of months predicted for.	Weather.	Wind.	Temperature.	Average.
		Per cent.	*Per cent.*	*Per cent.*	*Per cent.*
Lieutenant Story	11½	83.0	79.5	82.5	82.4
Lieutenant Greely	3	82.1	75.8	81.8	81.4
Lieutenant Kilbourne	6½	82.3	73.9	79.7	80.4
Lieutenant Dunwoody	27½	80.8	74.9	78.6	79.3
Lieutenant Powell	11½	82.3	79.8	78.9	80.7
Lieutenant Craig	6	78.5	74.2	75.2	76.7
Lieutenant Allen	5	80.5	72.9	76.4	78.1
Lieutenant Glassford	4	80.9	71.9	74.8	77.6
Lieutenant Woodruff	6½	76.1	68.8	74.1	74.6
Lieutenant Maxfield	2	79.7	72.1	78.3	78.4
Lieutenant Greene	3	75.4	71.1	73.6	75.2
Lieutenant Walshe	1	71.2	66.2	66.5	68.8
Lieutenant Beall	2	74.0	67.2	75.8	74.0
Lieutenant Finley	1	67.2	65.5	75.8	70.5
Professor Abbe	2½	79.4	73.7	67.5	74.1
Professor Hazen	3	77.6	76.9	71.5	75.1

These percentages indicate in a measure the success of the Service in its predictions, yet in a careful study of the subject of verifications one is impressed by the extent to which certain conditions influence the percentages attained. It is believed that an official's ability to successfully predict "weather" is, in a manner, proportional to the preponderance of "fair weather." Instances confirming this statement might be cited from almost any month when an unusual amount of fair weather prevailed over the territory east of the Rocky Mountains.

Predictions of fair weather (absence of rainfall) were then made with assurance and in a great many cases perfectly verified, resulting in a high percentage, which may not necessarily indicate any special skill or ability.

Such favorable circumstances occur occasionally in each month, but generally are limited both in the length of time they prevail and in the extent of territory affected.

Failures in predictions, it is believed, are more frequently failures to predict precipitation that actually occurs than to predict its absence or fair weather. That is to say, an official's predictions of fair weather are more nearly perfectly verified than his predictions of rain. In this connection it may be said that no rules for verifications thus far devised are sufficiently just, in all respects, in rating predictions in which precipitation is included. Difficulty is experienced in selecting simple expressions that are at once generally intelligible and properly describe the conditions anticipated. Moreover, in cases of precipitation it is impossible to always correctly infer the actual character of the rainfall in a district from the scattered reports at long intervals. It is considered, therefore, that percentages for different months differ as much perhaps from monthly peculiarities as from individual skill on the part of the official preparing the indications.

Heretofore the percentage of justification of wind signals has been simply the total number of signals verified divided by the total number of signals ordered, taking no account of the number of late signals, or those which were displayed after the verifying velocity had begun, nor of the storms which passed without signals. Such a system is eminently faulty, a striking illustration of which is found in the case of one month when seven signals were ordered. All of these signals being verified the official received 100 per cent., notwithstanding that five signals out of the seven were late and that during the month 115 storms passed without signals; that is, only two signals were ordered correctly and 115 more should have been displayed. This particular case affords also an illustration of the justness of the percentages obtained by the method described below, according to which that month receives 9 per cent., the lowest in eight years.

Various elements require consideration in arriving at a thoroughly satisfactory system for determining these percentages, and it is believed these are recognized as nearly as may be in the following plan, which has been applied to the signals for the eight years ending June 30, 1888, with the results shown in the accompanying table (No. 2).

[Extract from Table No. 2.]

Average percentages of indications officers for the eight years ending June 30, 1888.

JUSTIFICATION OF WIND SIGNALS.

Name.	No. of months on indications duty.	Per cent.	Name.	No. of months on indications duty.	Per cent.
Lieutenant Story	11¼	53.1	Lieutenant Woodruff	6¼	49.2
Lieutenant Greely	3	69.8	Lieutenant Maxfield	2	37.2
Lieutenant Killbourne	6¼	52.4	Lieutenant Greene	3	62.9
Lieutenant Dunwoody	27¼	63.2	Lieutenant Walshe	1	54.2
Lieutenant Powell	11¼	68.7	Lieutenant Beall	2	51.3
Lieutenant Craig	6	65.7	Lieutenant Finley	1	33.6
Lieutenant Allen	5	60.5	Professor Abbe	2¼	37.5
Lieutenant Glassford	4	47.7	Professor Hazen	3	68.0

Each signal verified for velocity, deducting late, is multiplied by 60; each late signal is multiplied by 35; each signal verified for direction is multiplied by 40. The sum of these products is divided by the total number of velocity signals ordered, multiplied by 0.6, plus the total number of direction signals ordered, multiplied by 0. 4, plus the total number of storms without signals, multiplied by 0.5, and the quotient is the desired percentage.

Previous to September, 1887, cautionary signals were ordered without regard to direction, and the above rule was extended for this case so that—

Each cautionary signal verified, deducting late, is multiplied by 100; each late signal is multiplied by 75.

The divisor is also increased by the total number of cautionary signals ordered.

Very respectfully submitted.

C. F. MARVIN,
Assistant Professor, Signal Service.

The CHIEF SIGNAL OFFICER.

TABLE No. 1.—*Percentages of verifications of indications for the eight years ending June 30, 1888.*

	1880.	1881.	1882.	1883.	1884.	1885.	1886.	1887.	Average
July:									
Weather	80.0	86.6	86.0	81.3	80.5	75.8	69.4	67.2	78.4
Wind	70.8	76.1	82.2	79.1	70.2	70.4	65.0	65.5	72.4
Temperature	80.3	80.3	83.6	81.9	79.0	77.7	76.9	75.8	79.4
Average	79.2	83.0	84.7	81.3	78.9	76.0	72.0	70.5	78.2
August:									
Weather	83.7	81.4	84.0	80.6	82.1	76.8	74.2	70.6	79.2
Wind	71.1	78.4	77.4	74.7	73.2	65.2	70.8	68.9	72.5
Temperature	79.8	84.4	73.8	82.4	73.6	79.7	77.9	79.0	78.8
Average	80.9	82.3	79.3	80.7	77.8	76.8	75.3	73.8	78.4
September:									
Weather	78.2	82.9	85.0	80.7	81.7	85.6	72.2	80.8	80.9
Wind	77.1	73.8	81.1	78.1	70.0	72.6	68.7	77.0	74.6
Temperature	79.4	82.2	84.0	80.4	70.9	76.2	75.4	76.9	78.2
Average	78.6	81.7	84.2	80.3	76.2	80.5	73.1	78.9	79.2
October:									
Weather	82.9	81.7	80.3	82.5	80.2	83.5	85.3	80.7	82.1
Wind	80.3	72.2	76.1	82.9	73.6	77.6	73.4	79.3	76.9
Temperature	83.2	79.4	82.4	84.3	71.6	77.1	78.8	76.4	79.2
Average	82.8	79.8	80.7	83.3	76.1	80.4	81.5	78.8	80.4
November:									
Weather	82.9	81.2	80.0	81.3	83.1	84.2	77.4	88.0	82.3
Wind	75.6	75.0	82.4	74.5	75.3	76.9	72.0	78.5	76.7
Temperature	80.2	80.7	83.3	81.0	75.8	77.2	73.4	77.9	78.7
Average	81.1	80.4	81.6	80.5	79.4	80.7	75.3	88.0	80.3
December:									
Weather	84.0	83.3	82.4	80.3	78.4	85.8	71.2	78.5	80.5
Wind	76.3	82.4	76.0	75.2	70.0	79.2	66.1	79.2	75.5
Temperature	76.4	81.7	83.0	78.1	68.0	77.2	66.5	75.9	75.9
Average	80.2	82.6	82.0	78.9	73.4	81.7	68.8	77.5	78.1
	1881.	**1882.**	**1883.**	**1884.**	**1885.**	**1886.**	**1887.**	**1888.**	
January:									
Weather	73.1	74.3	84.2	85.3	81.3	82.8	72.2	74.2	78.4
Wind	72.7	69.3	80.0	80.0	75.9	83.4	70.3	75.4	75.9
Temperature	74.4	79.6	83.9	81.6	75.9	77.4	76.2	69.0	77.3
Average	73.6	75.9	83.7	83.3	78.6	80.7	73.6	72.2	77.7
February:									
Weather	83.2	79.4	82.0	82.4	78.1	87.3	70.7	83.6	80.8
Wind	78.5	77.2	83.4	71.5	70.9	83.7	67.0	77.5	76.2
Temperature	82.9	81.2	82.0	73.5	75.2	81.2	76.7	77.5	78.7
Average	82.6	79.9	82.1	77.8	76.2	84.5	72.7	80.6	79.5
March:									
Weather	79.7	74.9	83.7	80.3	83.0	78.0	76.6	81.1	79.6
Wind	75.7	76.3	81.5	69.5	74.7	75.6	72.5	74.4	75.0
Temperature	80.4	83.5	84.7	78.6	76.7	73.5	72.0	68.5	76.6
Average	79.6	78.5	83.9	76.5	79.6	76.0	74.4	75.4	78.0
April:									
Weather	84.1	80.4	81.7	79.6	80.0	83.0	81.4	83.4	81.7
Wind	72.8	81.1	72.4	72.7	71.1	82.4	72.4	77.4	75.3
Temperature	75.9	77.1	82.1	76.0	73.7	75.3	74.4	77.4	76.9
Average	80.9	79.2	80.9	77.5	76.6	79.9	77.7	80.4	79.1
May:									
Weather	76.9	85.9	86.3	80.4	79.3	78.2	67.8	78.0	79.1
Wind	69.2	81.8	83.0	68.8	72.3	76.6	66.9	76.0	74.3
Temperature	76.9	81.2	82.1	72.5	74.2	72.3	69.8	69.2	74.8
Average	76.1	83.6	84.3	76.1	76.6	75.7	68.5	74.2	76.9
June:									
Weather	81.2	81.9	78.0	79.0	80.1	77.7	75.7	81.2	79.4
Wind	73.1	73.9	77.7	71.4	80.6	67.7	64.1	76.9	73.2
Temperature	80.6	81.3	78.3	77.8	78.9	73.9	75.4	66.5	76.5
Average	80.2	80.9	78.1	77.8	79.7	75.2	74.4	74.9	77.6
Yearly:									
Weather	81.6	81.2	82.8	81.1	80.6	81.6	74.5	78.9	80.2
Wind	74.6	76.5	79.4	74.9	73.2	75.9	69.1	75.5	74.9
Temperature	79.2	81.0	81.9	78.6	74.4	76.5	74.4	74.2	77.6
Average	79.9	80.6	82.1	79.5	77.4	79.0	73.9	76.7	78.6

In calculating these percentages, 7 per cent. has been deducted from the official monthly percentages prior to July, 1885.

The average monthly percentages are obtained by multiplying the monthly percentages of weather by 5, wind by 1, and temperature by 4, and dividing the sum of the product by 10.

TABLE No. 2.—*Percentages of justifications of wind signals for the eight years ending June 30, 1888.*

Month.	Cautionary.			Off-shore and direction.				Total signals ordered.	Storms without signals.	Per cent.
	Ordered.	Justified.	Late.	Ordered.	Justified. Velocity.	Justified. Direction.	Late.			
1880-1881.										
July	68	56	9	.....	.....	.....	.....	68	73	51.7
August	115	87	17	9	6	9	.....	124	64	57.0
September	94	73	20	28	22	27	1	122	76	57.4
October	242	191	24	87	78	85	9	329	47	74.8
November	218	190	25	68	60	64	9	286	56	77.4
December	215	182	34	103	95	96	11	318	52	77.2
January	147	124	15	37	32	35	6	184	42	73.6
February	113	107	20	79	76	78	9	192	46	82.0
March	218	199	25	136	110	127	8	354	71	79.1
April	119	90	17	29	25	27	7	148	149	49.5
May	24	21	8	1	1	1	0	25	114	24.0
June	81	63	18	0	0	0	0	81	122	41.2
										*62.1
1881-1882.										
July	35	29	7	0	0	0	0	35	103	31.4
August	60	45	12	0	0	0	0	60	76	41.8
September	77	63	20	2	.....	1	0	79	70	51.2
October	231	178	42	31	22	28	9	262	74	63.1
November	221	199	42	69	63	55	10	290	149	67.5
December	139	125	29	113	101	99	13	242	147	68.5
January	97	94	15	111	108	96	16	208	147	67.5
February	139	130	18	78	78	70	9	217	183	52.5
March	174	162	23	64	61	58	12	238	124	70.2
April	195	168	29	13	12	10	0	208	80	69.3
May	91	73	30	13	6	10	2	104	141	42.3
June	100	82	13	8	8	8	1	108	95	55.2
										*56.7
1882-1883.										
July	7	7	5	.....	.....	.....	0	7	115	9.0
August	35	18	1	.....	.....	.....	0	35	75	24.7
September	146	115	21	50	39	45	1	196	79	64.2
October	144	116	12	4	3	4	1	148	121	55.8
November	173	152	21	22	22	20	6	195	85	70.2
December	115	101	30	75	70	70	17	190	166	58.3
January	127	104	16	22	15	20	1	149	102	58.4
February	92	75	10	72	65	61	11	164	116	60.0
March	117	115	18	34	30	32	10	151	130	64.3
April	124	113	26	2	2	2	0	126	103	61.3
May	139	117	26	6	6	3	1	145	129	54.1
June	51	41	9	.....	.....	.....	0	51	138	32.1
										*51.0
1883-1884.										
July	67	48	7	8	6	6	0	75	144	35.5
August	119	89	10	1	1	1	0	120	86	58.7
September	119	96	19	11	9	5	1	130	83	57.5
October	251	181	38	61	50	56	4	312	66	64.3
November	241	203	42	52	52	50	1	293	40	77.8
December	208	186	19	66	60	61	3	274	79	68.2
January	241	208	21	95	78	87	5	336	45	79.1
February	176	153	13	107	102	105	5	283	80	77.9
March	246	200	14	65	57	64	0	311	70	74.1
April	166	144	16	63	55	60	3	229	67	74.9
May	266	197	22	58	48	49	1	324	87	65.3
June	89	80	11	.....	.....	.....	0	89	41	70.9
										*66.6

* Yearly.

TABLE No. 2.—*Percentages of justifications of wind signals for the eight years ending June 30, 1888*—Continued.

Month.	Cautionary.			Off-shore and direction.				Total signals ordered.	Storms without signals.	Per cent.
	Ordered.	Justified.	Late.	Ordered.	Justified. Velocity.	Justified. Direction.	Late.			
1884-1885.										
July	122	97	13	23	14	23	0	145	106	56.2
August	59	28	7	.....	.....	.....	0	59	74	27.4
September	141	91	10	26	21	20	4	166	64	54.6
October	205	149	30	83	62	70	3	288	100	61.1
November	200	182	22	91	80	89	8	291	69	79.4
December	186	161	19	69	60	63	8	255	120	68.4
January	206	185	14	187	171	181	11	393	36	88.5
February	160	144	20	77	70	77	6	237	84	75.4
March	268	234	24	156	128	147	2	424	40	81.8
April	183	149	15	37	32	34	2	220	93	66.7
May	168	94	17	21	8	21	1	189	44	48.7
June	135	119	3	62	52	48	5	197	59	75.0
										*65.3
1885-1886.										
July	64	38	9	11	0	10	0	75	38	42.3
August	79	54	7	41	25	32	0	120	64	52.7
September	143	106	10	34	23	26	4	177	69	60.0
October	127	109	6	25	22	25	3	152	69	69.9
November	214	158	9	62	48	56	0	276	42	66.7
December	157	146	24	75	62	73	5	232	93	73.8
January	136	114	8	54	41	53	1	190	25	78.0
February	146	130	14	53	49	52	3	199	28	82.6
March	83	72	9	79	65	78	5	162	74	69.6
April	136	76	14	16	8	16	1	152	59	51.6
May	24	6	4	28	19	23	0	52	54	32.4
June	2	0	0	57	26	19	5	59	22	31.4
										*59.3
1886-1887.										
July	0	0	0	27	10	12	0	27	53	20.4
August	31	9	4	7	5	6	1	38	38	24.4
September	103	35	0	44	18	32	0	147	53	33.9
October	92	54	4	23	9	17	.....	115	36	50.0
November	24	15	1	282	233	241	3	306	63	74.2
December	24	9	.....	147	83	121	4	171	51	54.2
January	31	27	4	121	106	117	14	152	45	76.4
February	95	84	7	112	92	101	10	207	49	75.9
March	94	86	2	79	62	73	4	173	28	80.7
April	91	78	10	35	30	33	3	126	25	76.8
May	32	24	1	0	0	0	0	32	27	52.8
June	8	3	0	8	8	8	0	16	52	26.2
										*53.8
1887-1888.										
July	42	8	1	33	18	30	.....	65	53	33.6
August	26	15	5	.....	.....	.....	.....	26	59	25.0
September	†46	28	.....	55	.....	50	.....	.....	5	70.6
October	94	54	5	99	.....	89	.....	.....	3	68.5
November	109	89	14	94	.....	91	.....	.....	8	80.6
December	69	49	7	83	.....	78	.....	.....	8	74.9
January	54	37	12	56	.....	54	.....	.....	0	74.4
February	28	25	8	27	.....	27	.....	.....	13	70.0
March	40	25	5	45	.....	39	.....	.....	42	46.7
April	32	16	1	47	.....	44	.....	.....	25	53.6
May	37	22	10	39	.....	34	.....	.....	4	61.1
June	11	4	3	11	.....	10	.....	.....	15	12.2
										*55.9

* Yearly. †Beginning with September, 1887, the number of velocity signals ordered is multiplied by 6, and the number of direction signals by 4, and the sum of these products plus half the number of storms without signals is taken for the divisor.

TABLE NO. 2.—*Percentages of justifications of wind signals for the eight years ending June 30, 1888*—Continued.

MONTHLY AVERAGES FOR EIGHT YEARS.

Month.	Per cent.	Month.	Per cent.
July	35.0	February	72.1
August	38.3	March	70.8
September	56.2	April	63.0
October	63.4	May	47.6
November	74.2	June	43.0
December	67.9		
January	74.5		*58.8

* Average for eight years.

In obtaining the monthly percentages for wind signals, the rule given on the bottom of page 56 was used.

TABLE NO. 3.—*Statement showing percentages of indications officers for the year ending June 30, 1888.*

	Weather.	Wind.	Temperature.	Monthly average.	Wind signals.*	Cold-wave signals.
Lieutenant Finley: †						
July, 1887	67.2	65.5	75.8	70.5	42.6	.....
Lieutenant Dunwoody:						
August, 1887	70.6	68.9	79.0	73.8	57.7	.....
November, 1887	88.0	78.5	77.9	83.0	88.7	80.1
February, 1888	83.6	77.5	77.5	80.6	94.5	8 .1
Annual average	80.7	75.0	77.8	79.1	80.3	83.1
Lieutenant Craig:						
September, 1887	80.8	77.0	76.9	78.9	77.2	.....
April, 1888	83.4	77.4	77.4	80.4	76.0	66.1
Annual average	82.1	77.2	77.2	79.7	76.6	66.1
Professor Hazen:						
October, 1887	80.7	79.3	76.4	78.8	74.1	32.6
January, 1888	74.2	75.4	69.0	72.2	82.7	69.0
May, 1888	78.0	76.0	69.2	74.2	73.7	57.9
Annual average	77.6	76.9	71.5	75.1	76.8	53.2
Professor Abbe:						
December, 1887	78.5	79.2	75.9	77.5	83.4	78.2
March, 1888	81.1	74.5	68.5	75.4	75.1	54.0
June, 1888	81.2	76.9	66.5	74.9	63.6	.....
Annual average	80.3	76.9	70.3	75.9	74.0	66.1
Lieutenant Woodruff: ‡						
November, 1887	77.5	76.3	71.5	75.0	.....	87.5
December, 1887	80.9	75.9	78.9	79.7	.....	84.1
January, 1888	75.6	73.7	68.9	72.7	.....	92.6
February, 1888	74.5	72.8	69.8	72.4	.....	83.0
March, 1888	71.8	75.9	61.3	68.0	.....	61.2
April, 1888	85.5	75.5	73.2	79.6	.....	49.3
Annual average	77.6	75.0	70.6	74.6	.....	76.1
Lieutenant Maxfield: §						
July, 1887	92.9	79.4	83.6	87.8	.....	.....
August, 1887 ‖	.....	.....	.....	.....	.....	.....
September, 1887	87.2	65.7	88.4	85.5	.....	.....
October, 1887	89.1	77.4	70.1	80.3	.....	.....
November, 1887	89.6	80.1	78.2	84.1	.....	.....
December, 1887	88.2	72.8	68.5	78.8	.....	.....
January, 1888	84.0	78.8	71.3	78.4	.....	.....
February, 1888	84.3	79.8	77.3	81.1	.....	.....
March, 1888	81.8	79.2	72.4	77.8	.....	.....
April, 1888	85.9	82.7	63.4	76.6	.....	.....
May, 1888	90.6	79.6	76.4	83.8	.....	.....
June, 1888	88.8	79.5	77.7	83.4	.....	.....
Annual average	87.5	77.7	75.2	81.6	.....	.....

* The percentages of wind signals in this table were obtained by combining the percentages for velocity and direction.

† This was Lieutenant Finley's first month on indications work.

‡ Predictions made for Minnesota and Dakota only.

§ Predictions made for California, Oregon, and Washington Territory only.

‖ No predictions.

TABLE No. 4.—*Statement showing percentages of justifications of wind signals for the year ending June 30, 1888.*

Month.	Total No. ordered for velocity.	Justified.	Per cent.	Total No. ordered for direction.	Justified.	Per cent.	No. ordered late.	Per cent.	No. of storms without signals.
1887.									
July	75	26	34.7	33	30	90.9	1	1.3	53
August	26	15	57.7	0	0	0	5	19.2	59
September	4[illegible]	28	60.9	55	50	90.9	0	0	5
October	94	54	57.4	99	89	89.9	5	5.3	3
November	09	89	81.6	94	91	96.8	14	12.8	8
December	69	49	71.0	83	78	94.0	7	10.1	8
1888.									
January	54	37	68.5	56	54	96.4	12	22.2	0
February	28	25	89.3	27	27	100.0	8	28.6	13
March	40	25	62.5	45	39	86.7	5	12.5	42
April	32	16	50.0	47	44	93.6	1	3.1	25
May	37	22	59.5	39	34	87.8	10	27.0	4
June	11	4	36.4	11	10	90.9	3	27.3	17
Total	621	390	62.8	589	546	92.6	71	11.4	237

These percentages are the same as those published in the Monthly Weather Review, and were computed by the rules formerly used, the rule applied in preparing Table 2 having been adopted July 1, 1888.

TABLE No. 5.—*Statement showing percentages of justifications of cold-wave signals for the year ending June 30, 1888.*

Month.	Ordered.	Justified.	Per cent.
1887.			
July	0	0	0
August	0	0	0
September	0	0	0
October	95	31	32.6
November	199	160	80.4
December	379	300	79.2
1888.			
January	342	255	74.6
February	298	253	88.6
March	311	175	56.2
April	91	55	60.4
May	19	11	57.9
June	0	0	0
Total	1,734	1,240	71.5

Of these signals, 1,337 were ordered from the office at Washington City, of which 933, or 69.8 per cent., were justified, and 397 were ordered from the office at Saint Paul, Minn., of which 307, or 77.3 per cent., were justified.

TABLE NO. 6.—*Percentages of indications verified for the year ending June 30, 1888.*

States.	1887.						1888.						Annual average.
	July.	August.	September.	October.	November.	December.	January.	February.	March.	April.	May.	June.	
Maine	62.6	79.8	78.8	77.5	83.0	76.3	73.8	83.4	72.6	84.3	66.7	66.7	75.5
New Hampshire	67.2	76.1	77.9	80.5	80.3	74.2	74.2	84.0	73.8	80.0	70.4	63.5	75.2
Vermont	67.3	78.7	77.7	80.0	77.6	69.8	70.1	77.7	68.0	80.6	68.0	63.9	73.3
Massachusetts	71.0	75.8	77.9	76.5	80.1	75.1	70.0	83.6	71.6	78.8	67.3	67.1	74.6
Rhode Island	73.5	73.1	79.2	78.3	81.1	78.1	69.8	81.4	73.8	78.0	71.4	68.4	75.5
Connecticut	70.3	77.2	79.4	74.7	80.1	78.2	67.3	86.2	72.4	79.6	67.6	72.0	75.4
Eastern New York	62.0	76.6	81.9	76.9	84.7	72.9	69.5	81.3	71.9	80.5	69.6	77.3	75.4
Eastern Pennsylvania	72.2	72.1	85.6	75.8	84.8	74.0	74.3	81.7	74.5	85.8	70.9	77.2	77.4
New Jersey	73.2	76.0	81.9	77.2	83.2	76.1	73.6	80.8	77.1	81.8	72.5	79.8	77.8
Delaware	71.5	71.9	82.6	79.5	85.6	75.8	73.3	79.5	73.6	83.6	74.7	78.6	77.5
Maryland	69.8	71.2	80.6	81.8	87.0	77.0	75.1	82.9	73.9	82.2	69.9	74.4	77.2
District of Columbia	70.4	69.9	79.6	80.2	83.1	78.3	74.0	82.1	72.8	83.3	70.4	72.9	76.4
Virginia	68.5	71.0	79.6	79.3	84.5	77.0	72.6	78.2	75.6	79.5	71.7	74.4	76.0
North Carolina	77.4	72.5	82.0	82.0	83.0	80.6	73.4	81.0	78.0	78.5	71.2	76.9	78.0
South Carolina	80.0	73.7	78.3	84.0	85.7	76.5	74.6	79.6	75.1	81.9	73.8	73.4	78.1
Georgia	76.9	78.9	78.4	79.1	84.3	79.0	71.0	78.5	73.0	80.7	77.0	73.1	77.5
Eastern Florida	70.6	81.9	82.0	75.1	83.3	73.2	77.0	78.7	76.7	82.1	86.8	77.7	78.8
Alabama	73.1	72.7	78.9	79.8	83.1	81.6	71.7	75.1	78.3	83.5	78.8	78.7	77.9
Mississippi	69.1	79.4	80.2	78.5	85.3	79.8	74.6	79.1	80.3	81.0	78.8	80.9	78.9
Louisiana	69.6	75.3	82.4	75.6	83.9	73.4	74.5	78.9	83.8	80.8	83.4	82.5	78.7
Texas	87.4	75.3	81.8	72.5	82.6	74.0	73.2	79.6	75.2	80.8	82.8	81.3	79.1
Arkansas	72.0	82.7	75.1	79.2	86.2	76.3	73.6	78.8	80.5	77.6	83.3	80.1	78.8
Tennessee	65.9	79.7	72.6	81.2	84.0	78.1	68.6	81.4	78.3	83.5	77.7	76.7	77.3
Kentucky	71.0	84.2	73.4	80.8	86.2	82.4	69.9	80.7	77.4	84.3	79.0	79.0	79.0
Ohio	78.0	80.4	76.3	78.3	83.6	77.9	69.4	80.8	71.8	86.6	75.8	79.1	77.7
West Virginia	83.2	72.8	80.1	81.9	83.6	79.8	68.1	80.7	80.0	80.0	75.2	80.9	78.9
Indiana	75.6	75.8	76.5	83.7	82.7	80.4	70.6	82.7	78.9	82.8	70.7	76.3	78.1
Illinois	73.4	71.4	77.6	81.3	82.3	81.0	72.0	80.3	80.3	80.5	77.9	78.6	78.1
Lower Michigan	69.3	76.0	83.1	75.9	77.6	77.7	71.2	80.7	76.1	80.9	77.3	74.1	76.7
Wisconsin	68.0	71.1	75.6	77.4	83.8	80.9	69.9	82.1	73.7	78.6	71.6	72.7	75.4
Minnesota	66.8	67.7	75.5	76.3	*75.0	*79.9	*72.9	*74.0	*67.3	*79.7	71.4	75.9	73.5
Iowa	66.8	65.4	81.1	80.6	82.2	82.8	75.4	79.6	74.7	78.4	70.8	74.9	76.1
Kansas	68.1	64.7	75.4	85.2	87.0	81.3	79.4	84.7	76.9	81.1	71.6	73.1	77.4
Nebraska	54.0	62.9	73.4	84.0	78.4	77.3	78.3	78.8	75.9	79.3	76.0	72.0	74.2
Missouri	77.8	73.5	78.6	82.9	83.9	80.6	73.8	80.1	80.5	77.6	74.7	79.8	78.6
Colorado	61.9	67.7	72.4	78.5	84.3	77.4	75.0	81.3	76.5	78.6	76.1	67.4	74.8
Eastern and Southwestern Dakota	48.3	61.5	77.6	75.0	*75.0	*79.5	*72.6	*70.9	*68.7	*79.5	75.4	68.2	71.0
Western Florida	76.0	71.3	85.2	68.3	79.8	76.5	71.0	74.3	72.2	82.3	75.7	77.9	75.9
Western Pennsylvania	63.4	78.8	77.2	82.4	81.9	74.5	65.5	82.2	69.5	76.9	75.6	77.4	75.2
Western New York	69.4	73.1	79.5	79.3	81.9	75.7	65.0	79.7	73.1	76.2	76.8	78.4	75.7
Upper Michigan	63.9	62.7	77.5	72.6	78.2	82.5	72.4	77.3	72.4	69.1	69.9	68.4	72.2
Weather	67.2	70.6	80.8	80.7	88.0	78.5	74.2	83.6	81.1	83.4	78.0	81.2	78.9
Wind	65.5	68.9	77.0	79.3	78.5	79.2	75.4	77.5	74.5	77.4	76.0	76.9	75.5
Temperature	75.8	79.0	76.9	76.4	77.9	75.9	69.0	77.5	68.5	77.4	69.2	66.5	74.2
Monthly average †	70.5	73.8	78.9	78.8	83.0	77.5	72.2	80.6	75.4	80.4	74.2	74.9	76.7

* Predictions issued from office at Saint Paul, Minn.; percentages not used in making up monthly and annual averages.

† The monthly average is obtained by multiplying the monthly percentages of weather by 5, wind by 1, and temperature by 4, and dividing the sum of the products by 10.

APPENDIX No. 3.

REPORT OF LIEUTENANT MAXFIELD ON THE OPERATIONS OF THE SIGNAL SERVICE ON THE PACIFIC COAST.

SIGNAL OFFICE, WAR DEPARTMENT,
San Francisco, Cal., July 12, 1888.

SIR: I have the honor to report the operations of this division for the year ending June 30, 1888, as follows:

The principal work of this division is that of making and publishing weather forecasts for the Pacific coast. These have been made twice daily, at noon and at 8 p. m., as during previous years. The rapid growth of agricultural industries on the Pacific coast, particularly that of fruit-growing, has rendered necessary a wider publication of the daily weather forecasts. In previous years these have reached points outside of San Francisco mainly through the agency of the Associated Press, special warnings, however, having been sent, on the occurrence of rain, to a small number of points, principally in the raisin-drying districts of California. During the past year a step toward providing a wider distribution of the daily forecasts has been taken, they having been telegraphed daily to several points in Oregon, Nevada, and Washington Territory. In California the matter had already been taken up by Mr. M. H. De Young, the proprietor of the San Francisco Chronicle. Special arrangements were made by this gentleman with the Western Union Telegraph Company by which the daily "indications" were telegraphed during the greater part of the wet season to all offices of this company in the State and there bulletined by the operators This service was received with great favor by the agricultural community, and should be continued, though on a smaller scale, by the Signal Service.

This matter has received careful consideration during the past year and the following plan is recommended for adoption:

(*a*) The telegraphing of "indications" daily to a number of points, not to exceed twenty, in the raisin-drying districts of California, beginning at the time of the earliest rains, about the middle of September. As raisins while drying can be readily protected from damage provided a few hours' warning of the occurrence of rain be given, the necessity of giving such warning is apparent.

(*b*) The sending of the daily indications for the benefit of the general agricultural community to additional points in the Pacific States during the wet season. The number of such additional points need not exceed seventy to secure a very complete distribution of the daily forecasts and to meet the needs of those engaged in agricultural pursuits.

As such a service as above proposed is only needed for six months in each year, it can be maintained at a comparatively small cost.

The display of cautionary signals giving warning of winds dangerous to shipping has been continued during the year at ports on the Pacific and on Puget Sound. Much difficulty has been experienced in making these displays well in advance of storms, on account of the fact that the first marked indications of an incoming storm usually are observed on the evening weather chart, while the telegraph offices at the greater number of points at which signals are displayed are not open during the night. As the observations which are entered on the evening chart are, during the coming year, to be made two hours earlier than in the past, storm warnings can be sent out before the closing of the telegraph offices for the night, and greater accuracy secured in the displays.

Study has been given during the year to the local peculiarities in the fall of rain in the Pacific Coast districts, in order that the special "indications," made for small areas, might be as accurate as possible. In prosecuting such study reports have been available, not only from Signal Service stations, but also from nine observing stations established by Mr. DeYoung at the following points: Yreka, Mendocino City, Modesto, San Luis Obispo, Bakersfield, San Bernardino, Santa Rosa, Indio and Carson City. In the establishment of these stations, the Signal Service co-operated by furnishing the necessary instruments.

In addition to the monthly meteorological reports received from the stations of the Signal Service, mail reports have been received from a large number of voluntary observers, and from the observing stations maintained by the Southern Pacific Railway Company. The data thus obtained has been used in the monthly weather review issued each month, and has enabled this office to comply with many requests for rainfall and temperature data. Rainfall tables, showing the precipitation at stations of the Southern Pacific Railway Company since 1870, have been compiled from the records on file at the office of that corporation.

The publications issued regularly by this office have been a monthly weather review and a weekly summary showing the departure in rainfall and temperature from the normals. There has also been issued monthly a table showing the meteorological conditions during each month at selected stations, for publication in the monthly report of the State Board of Health, and in the Sacramento Medical Times.

During the month of August an inspection was made of the observing stations at Eureka, Sacramento, Red Bluff, Keeler, Winnemucca, and San Francisco, and in January a survey of the route for the Point Reyes telegraph line was made.

Tables are appended showing (1) number of letters received and sent, and meteorological forms received; (2) office force during the year; (3) expenses incurred during the year; (4) distribution of "indications."

I am, sir, very respectfully, your obedient servant,

J. E. MAXFIELD,
Second Lieutenant, Signal Corps.

The CHIEF SIGNAL OFFICER, U. S. ARMY,
Washington, D. C.

TABLE IV.—*Distribution of "indications."*

Distribution of synopses and indications.		Points to which daily indications have been sent.	Points to which special warnings have been sent.
Noon.	8 p. m.		
San Francisco Evening Post. San Francisco Evening Report. San Francisco Evening Bulletin. Western Union Telegraph Company. California Associated Press. Associated Press. Merchants' Exchange.	San Francisco Chronicle. San Francisco Daily Call. San Francisco Daily Alta. San Francisco Daily Examiner. San Francisco Daily Commercial News. San Francisco Daily The Guide. San Francisco Daily Journal of Commerce. Western Union Telegraph Company. Golden Gate Woolen Mills. Postal Telegraph Company. California Associated Press. Associated Press. Merchants' Exchange. Superintendent Omnibus Railroad Line.	Dayton, Nev. Virginia City, Nev. Genoa, Nev. Wadsworth, Nev. Reno, Nev. Winnemucca, Nev. Lovelocks, Nev. Carson City, Nev. Ashland, Oregon. Roseburgh, Oregon. Albany, Oregon. Salem, Oregon. Medford, Oregon. Eugene City, Oregon. Walla Walla, Wash. Spokane Falls, Wash. Pasadena, Cal.	Fresno, Cal. Los Angeles, Cal. Mendocino City, Cal. San Diego, Cal.

NOTE.—Tables I, II, and III omitted.

APPENDIX NO. 4.

SUMMARY OF WORK PERFORMED IN REVIEW DIVISION.

Review Division proper.—Preparation of the manuscript copy of the Monthly Weather Review and accompanying charts.

International Bulletin subdivision.—Preparation of the summary and review of international observations and accompanying charts; computation of international ten-year normals and construction of charts based on same.

Draughting subdivision.—Architectural, mechanical, and topographical drawings and tracings; mountings of maps and charts; reductions of maps; transfers of the various charts issued by this office; blue prints; and inspection of charts, etc.

Respectfully submitted,

H. H. C. DUNWOODY,
First Lieutenant, Fourth Artillery, A. S. O. and Assistant.

WORK DONE IN REVIEW DIVISION PROPER DURING THE FISCAL YEAR ENDED JUNE 30, 1888.

In this division have been prepared during the year twelve numbers of the Monthly Weather Review, for each month from June, 1887, to May, 1888, inclusive. In the compilation of each issue were used from eight hundred to one thousand reports of meteorological observations taken at the various stations, viz: the regular Signal Service stations, those of voluntary and State weather observers, and of United States Army post surgeons. In addition to the above-mentioned reports, meteorological data obtained from special reports and clippings of newspapers forwarded to this office by observers at the various stations have been used, together with such reports from tornado observers as have contained information of value. The tabulated data published in the Monthly Weather Review, which in former years was arranged for publication in this division, is now prepared in the Records Division and furnished this room, where the data is charted and discussed. The meteorological journals from the regular Signal Service and voluntary observers (about 175 from the former and 300 from the latter each month), however, are examined and extracts made therefrom in the Review Division, as in former years. Prior to January, 1888, the work of checking the receipt of all reports from voluntary observers and those of the international system was done in this division, but in that month this work was transferred to the Records Division, where it has since been done. From July 1, 1887, until the transfer of this work to the Records Division there were received in the Review Division about 2,700 reports of international simultaneous observations and about 2,000 reports from voluntary observers in the United States. The receipt of these reports was checked and acknowledged by this division. During the year ended June 30, 1888, about 1,600 letters were referred to this division for note, recommendation, or complete action.

The Monthly Weather Review, which for several years has been regarded as one of the most valuable meteorological publications extant, has contained during the year, from time to time, special articles, charts, etc., bearing upon subjects of interest to meteorologists as well as to the general public. In addition to the usual current matter presented during the year the following may be mentioned as some of the special features: Discussion of the subject of fog predictions for the banks of Newfoundland; charts showing for selected stations normal and current temperature curves; soil temperature and moisture, notes and charts; coincidence of sun spots with thunder storms and auroras; effect of rainfall upon temperature of the air; mean temperatures determined from observations of maximum and minimum thermometers; observations on the thermal belt of Polk County, N. C.; meteorological and health chart for Ohio, August, 1887; direction of movement of areas of low pressure; rain and snow from a cloudless sky; hourly variations of atmospheric pressure; Chinook winds; self-registering barometers and thermometers; chart showing average date of last killing frost; charts illustrating conditions attending the great storm of March 11–14; normal rainfall charts for the months April to July.

From July 1 to December 6 there were four clerks assigned to this division, but since the latter date there have been but three.

Respectfully submitted.

H. H. C. DUNWOODY,
First Lieutenant, Fourth Artillery, A. S. O. and Assistant.

WORK PERFORMED IN THE INTERNATIONAL BULLETIN SUBDIVISION OF REVIEW DIVISION DURING THE YEAR ENDED JUNE 30, 1888:

The storms, Arctic ice, and fog of the north Atlantic Ocean have been charted and described for the Monthly Weather Review.

The Monthly Summary and Review of International Meteorological Observations has been regularly published.

The work of determining from simultaneous observations furnished by co-operating weather services and observers the general normal meteorological conditions over the northern hemisphere, has been carried on. This work was inaugurated in March, 1887, with a view of issuing tabulated and charted data showing the monthly and annual pressure, wind force and direction, and rainfall in the countries and at stations from which records of noon, Greenwich time, observations have been received from 1878 to 1887, inclusive. It is proposed to issue for each month charts showing respectively the normal distribution of atmospheric pressure and the normal monthly barometer changes over the northern hemisphere. In the preparation of these charts there have been used in addition to the regular simultaneous observations all available reliable data deduced from international polar observations and reports from isolated stations throughout the northern hemisphere. The charts will therefore present the results of an unparalleled series of international simultaneous observations, considered in connection with all meteorological observations of which reports have been made by co-operating weather services and it is believed will define with a large degree of accuracy the normal pressure and movements of the atmosphere over the northern hemisphere. In addition to the normal barometer charts there will be published charts showing in figures the number of cyclonic centers which have been traced through each square of 5° from which reports have been received for ten years. Lines indicating the most frequent tracks and direction of movement of storms in the several countries and over the oceans of the northern hemisphere will also appear.

On January 1, 1888, the marine work of this office was transferred to the Hydrographic Office, Navy Department, and all co-operating shipmasters of the mercantile marine were notified of the change and requested to forward their reports of simultaneous observations to the agents of the Hydrographic Office who had been designated to receive them. Through the courtesy of the Hydrographer, the data thus collected is utilized in the international work of this office, and the Chief Signal Officer is enabled in return to furnish monthly north Atlantic Ocean square barometer normals and other meteorological data for use in connection with the issue of the Pilot Chart.

Commencing with October 1, 1886, and including June 30, 1887, there have been prepared daily international charts showing the distribution of atmospheric pressure and the prevailing wind directions over the northern hemisphere as determined from noon, Greenwich time, observations.

Respectfully submitted.

H. H. C. DUNWOODY,
First Lieutenant, Fourth Artillrey, A. S. O. and Assistant.

WORK PERFORMED IN THE DRAUGHTING SUBDIVISION OF THE REVIEW DIVISION DURING THE FISCAL YEAR ENDING JUNE 30, 1888.

International daily meteorological charts prepared, 365; international monthly mean meteorological charts, 12; monthly weather review charts, reduced by hand, 36; blizzard charts, reduced by hand, 13; meteorlogical charts (monthly, seasonal, and annual), 75; other meteorological charts, completed, 75; architectural, mechanical, and topographical drawings, 363; architectural, mechanical, and topographical tracings, 173; charts, forms, and miscellaneous drawings, transferred to stone, 380; international daily meteorological charts, transferred to stone, 270; maps and charts mounted, 35; charts reduced by pantograph, 145; blue prints made, 160; charts inspected, 102,600.

The number of employés of this room continued the same as last year until November 16, when Private Sumner Bangs was transferred to the instrument division; he was however restored to this division January 12, when he was discharged at his request. The remaining force was then continued till the close of the year, when it became further reduced by the discharge of Private George Ritter.

Respectfully submitted.

H. H. C. DUNWOODY,
First Lieutenant, Fourth Artillery, A. S. O. and Assistant.

APPENDIX NO. 5

REPORT ON STATE WEATHER SERVICES AND OTHER CO-OPERATING METEOROLOGICAL SOCIETIES.

SIGNAL OFFICE, WAR DEPARTMENT,
Washington City, October 1, 1888.

SIR: I have the honor to submit herewith my report relative to State weather services and other co-operative meteorological societies for the year ending June 30, 1888.

The liberal policy which the Chief Signal Officer has pursued towards these services has resulted in increasing the efficiency of services already organized, and in the establishment of new services in the States of New York, Texas, and Kentucky, which, under the able co-operation of those who are specially interested in utilizing meteorological data and making the work of the Signal Service of more practical value, promise excellent results for the coming year.

The following list shows the States in which local weather services are now in operation, with the names of directors and Signal Service assistants:

States.	Central station.	Director.	Signal Service assistant.
Alabama	Auburn	Prof. P. H. Mell, Agricultural and Mechanical College.	
Arkansas	Little Rock	Prof. John C. Branner, State geologist.	W. U. Simons.
Colorado	Colorado Springs	Prof. F. H. Loud, Colorado College Observatory.	T. W. Sherwood.
Illinois	Springfield	Col. Charles F. Mills, secretary State Board of Agriculture.	James Cassidy.
Indiana	Indianapolis	Prof. H. A. Huston, Purdue University.	C. F. R. Wappenhaus.
Kansas	Topeka	Prof. J. T. Lovewell, Washburn College.	T. B. Jennings.
Kentucky	Louisville*	Under direction State Polytechnic Society.	J. B. Marbury in charge, since relieved by Frank Burke.
Louisiana	New Orleans		R. E. Kerkam (in charge).
Michigan	Lansing		N. B. Conger (in charge).
Minnesota	Saint Paul	Prof. W. W. Payne, Carleton College Observatory (Northfield).	E. C. Brandenburg.
Mississippi	University	Prof. R. B. Fulton, University of Mississippi.	M. J. Wright, jr.
Missouri	Saint Louis	Prof. F. E. Nipher, Washington University.	G. A. Weber.
Nebraska	Crete	Prof. Goodwin D. Swezey, Doane College.	C. D. Burnley, since relieved by G. A. Loveland.
Nevada	Carson City	Prof. Charles W. Friend, State geologist.	Charles A. Read, since relieved by E. H. Thompson.
New England Meteorological Society.	Boston	Prof. W. H. Niles, Institute of Technology (president).	O. N. Oswell.
New Jersey	New Brunswick	Prof. George H. Cook	E. W. McGann.
New York	Ithaca	Prof. E. A. Fuertes, Cornell University.	Isaac W. Brewer.
North Carolina	Raleigh	Dr. Herbert Battle, State Agricultural Department.	H. McP. Baldwin.
Ohio	Columbus	Prof. B. H. Thomas, State University.	Charles M. Strong.
Oregon	Roseburgh	Under the auspices of the Oregon Immigration Board and Portland Board of Trade.	B. S. Pague.
Pennsylvania	Philadelphia	Under direction of the Franklin Institute.	T. F. Townsend.
South Carolina	Columbia	Hon. A. P. Butler, commissioner of agriculture.	William Line, since relieved by H. C. Seymour.
Tennessee	Nashville	J. D. Plunket, M. D., president State Board of Health.	H. C. Bate.
Texas	Galveston	S. O. Young, M. D. (service organized by Galveston Cotton Exchange.	Allen Buell.

*Formerly Lexington.

It will be seen that each State service is furnished with a skilled assistant of the Signal Service, and in the detail of these assistants care has been taken to select men whose experience and qualifications specially fitted them for the performance of the varied and important duties to be performed. The detail of an assistant of this Service to aid in the local work is only a part of the aid rendered by the Signal Service to these organizations. The necessary supplies for the execution of the work, and the use of the Department frank in the collection of reports and distribution of bulletins, have been given to each service, without which it would not be possible in most cases to carry on the State services. In addition to the above the Chief Signal Officer has secured legislation which authorizes the issue of instruments to such voluntary observers as obligate themselves to furnish reports to this Service, provided a personal bond be given to secure the Government against loss. A number of instruments have been issued to observers, and a large number of applications for instruments have been recently received, which, when supplied, will greatly increase the importance of these services both to the States and to the national Service.

These services also aid the Signal Service in the distribution of weather indications, cold-wave and frost warnings, a feature of the local service the value of which can scarcely be overestimated. With thorough organization, the distribution of these warnings may be more complete, and the agricultural interests may be greatly benefitted.

The directors of State weather services have been authorized to select a number of stations to be supplied with these warnings, and the Chief Signal Officer has authorized the telegraphing of the same daily at the expense of the Signal Service. Indiana has taken the lead in this feature of the work, and at the close of the year one hundred and forty stations were receiving the daily telegrams and displaying flags in that State; and numerous reports from that section indicate that this branch of the State service is greatly appreciated by the citizens of that State. This wide distribution of the Signal Service weather forecasts, especially warnings of cold-waves, will be more fully appreciated in the Ohio Valley States after one year's experience; and there will doubtless be a greater demand for the increase of stations in and south of the Ohio Valley.

The organization of State services in Texas and Kentucky will prove of special value, as these services will be enabled to widely distribute warnings of cold waves, "northers," and frosts, thereby warning the stock regions of Texas and the tobacco districts of Kentucky of approaching weather changes likely to prove injurious to stock or growing crops. The service in Kentucky is not thoroughly organized and doubtless the distribution of recent frost warnings, which were sent to that State in ample time by this Service to enable the tobacco-growers to cut their crops, was not as complete as it would have been had the State service been prepared for the utilizing of such warnings. The value of these warnings to the planters of Kentucky was pointed out by me in 1881 when I visited that State for the purpose of organizing a State service, and had my recommendation been carried out probably one-half of the tobacco lost during the recent frost would have been saved to the planters. The Signal-Service did its part of the work in the timely issue of the warnings, which were telegraphed to Kentucky, Virginia, and adjoining States. The Signal Service is also prepared to duplicate these telegrams from central stations in States to as many points as may be necessary, but it can not supply observers for this purpose, and must, therefore, depend upon voluntary services of those interested, and to make the distribution of warnings effective organization of local services is absolutely necessary. The increase in reports of State services, the improvement in the character of instruments, and uniformity of methods in observing will greatly increase the importance of these valuable services. The present plan of the Chief Signal Officer is to secure a voluntary station in each area of 50 miles square, thus providing a station for almost every county in the State, and with such a distribution of stations the value of the data collected would increase with each year's observations, and the study of such data in connection with the cultivation of particular crops would be valuable to the farmer as a guide in planting crops. While the valuable reports are utilized promptly by the issue of State bulletins, they are forwarded to the central office and utilized in the preparation of the Monthly Weather Review, which contains a brief summary of each State bulletin. The rain charts of the Signal Service are much more complete since the organization of State services, as each chart is based upon about one thousand reports distributed over the various States of the country, the stations being most numerous in those States where State services are in operation. These charts, as also the temperature charts, are of great value, and they are largely based upon voluntary data.

The most noticeable feature of State weather service work during the past year, and one which has been most appreciated by the agricultural interests, was the weekly weather-crop bulletins which have been issued regularly during the growing season by the State services in conjunction with the weather-crop bulletins of the national service. These bulletins contain reliable reports from many observers distributed throughout the

State giving the weather conditions for the week and the effect of same upon the growing crops. These reports are sent by mail at the close of each week to the State center and for the basis of the State weather-crop bulletins, and also the basis of the telegram which the signal assistant sends to the Chief Signal Officer at Washington. The State bulletins are issued on Saturday, and the national weather-crop bulletin on Sunday of each week. The normal temperature and rainfall for each Signal Service station has been determined from past observations, and these are compared each week with the telegraphic reports received at the central office, and from these comparisons and the telegrams from the several States the text of the weather-crop bulletin is prepared and issued by 12 o'clock noon, Sunday. This bulletin is then mailed back to the States, and is given to the press of the country in time for Monday's morning papers. The reports from many States show that the bulletin is regarded by the farmers as one of the most valuable features of signal service work.

The following letter from a farmer in New Jersey indicates the practical value of these bulletins to the agricultural classes:

UNION, N. J., *July* 24, 1888.

SIR: My brother farmers come to this station within an hour after the reception of the weekly crop bulletin, and hear it read. A score of them have charged me to convey to you their hearty thanks for the valuable and timely information it contains. The farmers appreciate your good work.

This prompt intelligence can be obtained here in no other way. The condition of the crops of the whole State is known here within a circle of a mile from this station in a few minutes after the bulletin arrives, and before the close of the day in a large part of our township.

To obtain just this kind of intelligence far in advance of the farmer the sharp speculator pays a high price, and too often heretofore the farmer has accepted a price for certain products far below their actual value. It is well known the farmer gets little enough for his produce, while the consumer is made to pay a high price. This bulletin should be widely disseminated throughout New Jersey for the benefit of its farmers.

I might enlarge on the usefulness of this bulletin. The point in the following "parable" is apparent to you:

We do not raise grapes here extensively. One of my neighbors has an acre promising well. No rot at present is appearing here. A dealer saw the advantage of securing this crop rather than depend on shipments from York State or elsewhere. It being near at hand, he could market it at most favorable times. Yesterday he offered the farmer what might usually seem a fair price. The farmer brought him to this station and I read to them the report from South Jersey: "Concords seven-eighths gone, Clintons half." The result was the speculator advanced his offer $30 and the bargain closed.

The farmer told afterwards that he considered the bulletin worth just $30 to him in this instance alone. Comment: The dealer was posted; so was the farmer.

Very respectfully,

F. L. DUNBAR.

E. W. MCGANN,
Observer, State Weather Service.

It is to be regretted that the act providing for the organization and support of the New Jersey service failed to become a law after having passed both branches of the legislature, notwithstanding the numerous commendatory letters setting forth the practical value, and, in some cases, the actual money value of the weather-crop bulletin to the farmers of that State.

The successful operation of State weather services has secured to the people of those States in which such services are in operation many of the benefits for which these services were organized. The object of these services, as originally stated in the "memorandum" prepared by committee of the general board of Signal Service assistants and sent by the Chief Signal Officer to all States, with a letter prepared by the same committee appointed to consider my original suggestion relative to the organization of State services in connection with the Signal Service, was as follows:

"The object of a State service should be to observe and utilize every feature of the weather that effects the prosperity of the inhabitants of the States, as to crops, health, life, etc., omitting, perhaps, those few items already provided for by the General Government at Washington, such as general storm predictions. The State service is therefore essentially a plan for the gathering and utilizing local climatic data, and eventually it will define precisely the localities most favorable or unfavorable to special crops, diseases, etc."

These services have now become an important feature of signal-service work, and the hearty co-operation of the National and State services is necessary, in order that the people may receive the full benefits resulting from each service.

The national service receives a large increase of valuable voluntary data contributed by the observers of the State service, which is used to advantage in the current statistical work of this office, and which, when combined with the regular Signal-Service reports, furnish material for a more thorough study of the conditions attending the development of storms, thus contributing to the ultimate improvement of the current work of the Signal Service. Not only are the reports of voluntary observers utilized in the preparation of the "Monthly Weather Review" of the national service, but they are also useful to the State in defining its climatic features, and for such purposes a series of observations from such stations become more valuable as the period covered by the observations is lengthened. Such meteorological records when studied in connection with crop productions will serve to determine the weather conditions best suited to the successful cultivation of particular crops and may become useful in determining the probable yield of any crop some time before harvest.

In the more recently settled States these services are of additional value, as they furnish information to those who anticipate emigration to those States. Similar use has been made of the observations made in some of the older States, within which but few obervations had been taken; and the popular impression as to climate was erroneously based upon a knowledge of prevailing climate in similar latitudes. The State services of Texas, Colorado, Nevada, and Oregon will doubtless be the means of correcting many popular errors prevalent as to the climate of those States, and thereby largely increase the immigration thereto.

These services have attracted the attention of a large class of intelligent observers, and the study of meteorology is increased, thus rendering the Signal Service reports, weather charts, and bulletins more useful to the public. The report of Col. Charles F. Mills, director of the Illinois service, furnishes an example of interest taken by the teachers of the public schools of that State.

The records furnished by State services have also been used with great success by physicians in the study and treatment of special diseases, the State service of Michigan having originated with Dr. H. B. Baker, Lansing, secretary of the State Board of Health, who has made a most successful study of climatic changes and atmospheric conditions attending the prevalence of special diseases. Similar reasons led the State Board of Health of Tennessee to assume control of, and give support to, the weather service after the State Department of Agriculture had withdrawn its aid. The remarks of Dr. Plunket, president of the Tennessee State Board of Health, will be found quoted in the Texas bulletin for June, accompanying this report.

Copies of the Signal Service weather crop bulletin and also those of State weather services are inclosed. The Signal Service assistants have generally performed faithful and efficient service, and I would respectfully recommend that all sergeants detailed in connection with State services receive the pay of sergeants at selected stations, and that the corporals and privates on duty as assistants be promoted to the rank of sergeant. The duties require more than the usual amount of traveling, as many short trips are necessary in the organization and inspection of stations which are made without expense to this service but not without expense to the observer, and as this service is all in the public interest, I think it no more than just to provide for this additional expense by the slight increase of pay which would come from their promotion. The services of Private Bate, of the Tennessee service, have been especially valuable in the preparation of weather crop bulletins, which have been considered valuable throughout the State by all interested in agriculture.

I inclose the detailed reports from the various State-service directors, from which may be seen the special features of the work of each service during the year.

No annual reports were received from the directors of the services in Colorado, and Kansas, and I have, therefore, selected a copy of the monthly report from each of these States, which will be found among the inclosures. The Texas service was organized recently and no annual report was rendered by the director, but the work of establishing a service in that State has been carried forward rapidly, as will be seen from the inclosed copy of the excellent bulletin that has been issued, the first number of which was for the month of June. No monthly reports have yet been issued from Kentucky and New York, and nothing from these States will be found among the following list of inclosures.

I am, very respectfully, your obedient servant,

H. H. C. DUNWOODY,
First Lieutenant, Fourth Artillery, A. S. O. and Assistant.

The CHIEF SIGNAL OFFICER,
Washington City.

[Inclosure I.]

ALABAMA POLYTECHNIC INSTITUTE.

OFFICE OF DIRECTOR OF STATE WEATHER SERVICE,
DEPARTMENT OF NATURAL HISTORY AND GEOLOGY,
Auburn, Ala., July 27, 1888.

SIR: In compliance with your request I have the honor to hand you herewith a synopsis of the work done by the Alabama weather service during the past year.

The effort has been made not so much to obtain a large number of observers as to secure reliable workers and carefully prepared data. Some of the observers, since my last annual report, have retired from the service, and others have been added in the places thus made vacant. The service has labored under some disadvantage since its organization on account of the lack of uniformity in the character of instruments in use. An effort has been made during the past year to remedy this difficulty as far as possible. There being no available funds at the command of the director, this undertaking was not so successful as one would desire.

The co-operation of the Signal Service has been of the greatest importance to us. Without the aid furnished by the Chief Signal Officer the service in Alabama would have been an impossibility. The State has never given its sanction to the service by legislative appropriation, but everywhere the people have expressed an appreciation for the work being done, and we think results of great value to the State will be obtained at some period in the future.

The monthly bulletins have been regularly issued, with the exception of one or two months immediately after the destruction of the central office by fire in June, 1887. During the crop seasons weekly reports have been made concerning the temperature, rainfall, amount of sunshine and the general conditions of the crops. The publications have been prized by parties interested in the results, and many papers of the State have republished the conclusions drawn from the tabulated data.

The daily weather and temperature predictions have been distributed by the Signal Service observer at Montgomery (Sergt. L. Dunne). The increase in the number of stations has not been as large as I would desire. This branch of the service has failed to sustain the degree of accuracy it held in the estimation of the people during the first two or three years of its introduction into Alabama. Up to last year a careful estimate shows that the average percentage of verification reached as high as 88. This year just closed, however, gives only 65. This falling off is to be deplored, because the farmers and market gardeners were beginning to rely upon the predictions as valuable aids in the prosecution of the enterprises under their charge.

The objection made by the Western Union Telegraph Company to the railroads transmitting these messages free has greatly reduced the number of stations displaying flags. All the railroads of the State, with two or three exceptions, had authorized their agents to display flags at all stations along the lines for the benefit of the public. All of this work has been discontinued since the Western Union Telegraph Company entered its protest.

The State Agricultural and Mechanical College, at which the central station is located has established a meteorological department in connection with the agricultural experiment station, and this has been placed under my charge. The instruments in use at the central station are as follows: Maximum thermometer, minimum thermometer, wet and dry bulb hygrometer, maximum solar radiator, minimum terrestrial radiator, barometer, wind-vane, Robinson's anemometer with electrical recording attachment, rain-gauge, and three sets of soil thermometers, consisting of thirty instruments, ranging from 1 inch to 96 inches in length.

With the facilities recently given the director by the Chief Signal Officer an attempt will be made during the coming year to locate a station in each county of the State. Special observations will be made at the central station during the coming winter, and also at other stations, to determine the depth of the frost line and the variation of temperature at certain depths below surface of the ground. Much valuable data has been collected concerning thunder storms that will be used in the future in the preparation of special bulletins.

Respectfully submitted.

P. H. MELL,
Director, Alabama Weather Service.

The CHIEF SIGNAL OFFICER,
Washington, D. C.

SPECIAL CROP BULLETIN OF THE STATE WEATHER SERVICE, CO-OPERATING WITH THE UNITED STATES SIGNAL SERVICE.

AUBURN, ALA., *week ending July* 28, 1888.

[This bulletin was compiled from reports made by "cotton-belt" stations of the United States Signal Service and regular observers of the Alabama service. Inasmuch as only 70 per cent. of all the stations have been heard from, the results contained herein may be somewhat changed when the bulletin for July is issued. Observers will please send in their reports more promptly.]

But little rain fell throughout the State during the past week, and the ground has become very dry. The continued sunshine has enabled the farmers to clean out the crops, but in some sections, particularly in South Alabama, the heat without the sustaining influence of moisture has scorched the tender leaves of the cotton-plant, causing shedding to take place.

The conditions at present are unfavorable to agricultural interests, and unless rains fall very soon the crops will be damaged.

The cotton caterpillars have not materially increased since the last report, and their numbers are so small but little injury has resulted. The farmers are successfully combating this insect by the use of Paris green.

The temperature has been about normal.

The director is now prepared, through the liberality of the Chief Signal Officer, to furnish maximum and minimum thermometers and rain-gauges to each county in the State. It would be very gratifying if towns and communities will select reliable and earnest observers and make immediate application to the director for instruments.

P. H. MELL, *Director.*

[Inclosure II.]

ARKANSAS STATE WEATHER SERVICE.

LITTLE ROCK, ARK., *July* 1, 1888.

SIR: I have the honor to submit the following report of the Arkansas State weather service for the year ending June 30, 1888. Mr. W. U. Simons, observer, served as the director of the State weather service of Arkansas up to March 16th, ultimo, when his excellency Governor S. P. Hughes appointed as director the present incumbent, Dr. John C. Branner, the State geologist, and the Chief Signal Officer detailed W. U. Simons to serve as his assistant.

In the mean while Mr. Simons remains in charge of the signal station at this place, and, as he has but one assistant, he is unable to give as much time to the State service as is desirable or as is necessary to render it most useful and satisfactory.

The present standing of the service is very much in advance of what it was a year ago. Reports made by trustworthy and intelligent observers are now received monthly from thirty-five stations, while reports for the weekly crop bulletin are received from about fifty counties. Indications are sent to twenty-two points where the flags are displayed, and the general interest in the service is largely increased throughout the State.

Col. B. T. Embry, of Atkins, says: "The flags are of great benefit here. The country people nearly all understand their meaning, and eagerly ask persons coming from town of a morning 'what flags are up?' and govern their day's work in accordance."

Dr. F. A. Rew, of Portia, writes:

"The indications have been phenomenally successful here, and our people place implicit confidence in them. They are of great value to fruit growers, as in their shipping season they gather fruit for shipment in different stages of ripeness dependent on the prospects of their encountering warmer or cooler weather in transit."

Similar reports come from nearly all points where flags are used. The issue of the weekly crop bulletin has met with very general approbation. This bulletin is used every Saturday, and reports are received for it from almost every county in the State. It is mailed to nearly all the county papers, and is republished by the majority of them as matter interesting to their readers. It is also telegraphed as a special to the Memphis Avalanche at that journal's expense for publication in the Sunday morning issue.

At several points the citizens have not only bought flags but have collected money to purchase instruments to be used in connection with this service.

The Chief Signal Officer having recommended that a station maintained upon each 50 miles square would give satisfactory results but little effort has been made to extend the service by increasing the number of permanent stations beyond that recommended. Several new stations have been opened, however, for making reports, and correspondence had in regard to opening others. The loan of instruments by the national service has

been of the greatest utility in this work, and reports are now received from nearly all parts of the State for the Monthly Review.

The table published in the Review has been increased, and instead of giving the highest, lowest, and mean temperatures and rain-fall at the stations, it gives nearly all the information called for on Form 184c, the report mailed to the Review department of the national service on the 15th of each month.

An effort will be made to have some official recognition of the State service's work by the next legislature, which meets in January, 1889, and it is hoped that we may be able to give sufficient time and attention to our publications between this time and that to impress the legislature with the unquestionable utility of such a service to the community. It is hoped, also, that the railroads in the State will co-operate with the State service as soon as it is recognized by the legislature and funds appropriated for the purchase of signals, and that they will authorize the display of such signals on all passenger trains crossing the State, as well as the sending of special reports of tornadoes free by wire from the observers to the central station.

JOHN C. BRANNER,
Director, State Weather Service.
W. U. SIMONS,
Private, Signal Corps, Assistant.

The CHIEF SIGNAL OFFICER,
Washington, D. C.

The following copy of the monthly bulletin issued by the Arkansas service for April, 1888, is given to show the character of the work being done in that State:

The mean temperature of the month was generally above the average, being at Washington 3°.6 above the average of twenty years, Little Rock 3°.4 above eight years, Fort Smith 4°.2 above five years, Lead Hill 4°.0 above seven years. It was above the mean of the same month last year at Helena 1°.1, Russellville 3°.0, Portia 1°.2, Eureka Springs 1°.5, while it was below the average of April, 1887, at Alexander 1°.3, at Brinkley 1°.7, at Conway °.8, at Osceola 1°.8. The highest records were 93° at Lead Hill, and 91° at Newport. The lowest records made were 30° at Malvern, 36° at Brinkley, Heber, and Lead Hill.

Frosts were reported on the 13th at Lead Hill, Lonoke, Portia, and Memphis, Tenn., and at Portia the 30th. The one of the 13th was observed in the valleys only at Eureka Springs.

The rain-fall was largely in excess through the western portions of the State, being at Fort Smith 2.40 inches greater than an average of five years, Washington 1.15 inches above twenty years; at Conway, 4.15 inches; at Russellville, 2.70 inches; Eureka Springs 1.02, and Alexander .18 inches, above the same month last year. While it was below the average of eight years at Little Rock 4.28 inches; at Lead Hill, 2.70 inches; below seven years record at Helena .40 inch; and Osceola .20 inch below April 1887.

Thunder-storms were reported on five days at Lead Hill, four at Alexander and Conway, three at Portia, two at Lonoke, and one at Fort Smith, Heber, Little Rock, Osceola, Paris, Tex., Eureka Springs, and Washington. The thunder-storm of the 6th was observed at the greatest number of stations, being reported from Lead Hill, Conway, Alexander, Fort Smith, and Heber. The one of the 23d was reported from Lead Hill, Alexander, Little Rock, and Lonoke.

Solar halos were observed at Little Rock the 7th, and Lead Hill 11th and 23d.

Lunar halos reported from Little Rock and Fort Smith the 23d, and Cairo, Ill., 22d.

Rainbow was observed at Little Rock the evening of the 23d, lasting about half an hour, and until a few minutes before sunset.

Hail of large size at Alexander at 1.50 a. m. the 7th. But few unusual phenomena were reported during the month, and although brisk to high winds occurred at several places there is no report of a cyclone or tornado during the month and but little damage reported from winds or thunder-storms. There has been no report so far received of buffalo gnats, although last year they were numerous in the bottoms as early as the 6th of the month. There has been some complaint of the cut-worm, especially in the central sections of the State. In some places they have destroyed whole fields of corn and garden crops. The strawberry crop promises to be above the average, and the apple and peach crop will be very good this year from the present indications.

Summary of meteorological reports of the Arkansas weather service for April, 1888.

Place.	County.	No. of days.	Thermometer.			Rainfall.	Name of observer.
			Highest.	Lowest.	Average.		
			°	°	°	In.	
Alexander	Pulaski	30	88.0	44.0	65.3	.90	I. Williams.
Altus	Franklin						L. B. Crenshaw.*
Arkansas City †	Desha	11	84.0	52.0	72.1	.07	C. C. Martyn.
Brinkley	Monroe	30	85.0	36.0	65.9	(‡)	C. A. Potter.*
Buck Range	Howard						T. J. Draper, M. D.
Cairo, Ill		30	82.5	40.0	61.4	3.08	C. L. Bozzell, U. S. observer.*
Conway	Faulkner	30	83.0	42.0	61.0	4.25	A. P. Robinson, C. E.
Dallas	Polk	30	92.0	45.0	61.9	7.07	Thad M. Carder.
Dayton	Sebastian						T. C. Miller, M. D.
DeVall's Bluff	Prairie	22	86.0	37.0	65.8	.50	B. J. Wilson.*
Eureka Springs	Carroll	30	86.0	34.0	63.1	3.64	A. H. Foot.*
Malvern	Hot Springs	30	89.0	30.0	60.2	.13	W. B. Burns.*
Forrest City	St. Francis	30	84.0	48.0	67.1		George Owens.*
Fort Smith	Sebastian	30	89.7	41.5	65.0	7.24	R. Q. Grant, U. S. observer.*
Heber	Cleburne	30	90.0	36.0	64.8	(‡)	P. Reeder, M. D.
Helena	Phillips	30	86.0	43.0	66.3	1.80	George Warren.*
Insane asylum	Pulaski						P. O. Hooper, M. D.*
Lead Hill (NE. of)	Marion	30	94.0	36.0	65.3	1.98	Silas C. Turnbo.
Little Rock	Pulaski	30	86.0	43.0	66.2	.84	W. U. Simons, U. S. observer.*
Lonoke	Lonoke	30	85.0	43.0	68.0	1.37	W. H. Pyburn.
Memphis, Tenn		30	86.0	43.0	66.0	1.15	E. A. Evans, U. S. observer.*
Monticello	Drew						E. B. Windes.*
Newport	Jackson	30	91.0	40.0	62.8	1.97	F. S. Morgan.
Osceola	Mississippi	30	84.0	50.0	64.3	2.40	Dr. D. A. Richardson.
Palarm	Faulkner						B. F. Dufield, C. E.*
Paragould	Greene						James Elliott.
Paris, Tex		30	91.0	48.0	68.0	4.59	E. S. Stephens.*
Pine Bluff	Jefferson	30	87.0	43.0	67.9	4.64	W. S. Walker.
Portia	Lawrence	30	89.0	41.0	65.5	3.10	F. A. Rew, M. D.*
Prescott	Nevada	30	93.0	45.0	66.2	.79	William Friganza.*
Russellville	Pope	30	90.0	40.0	66.3	3.90	W. S. Frasey.*
Shreveport, La		30	87.0	46.0	69.3	4.49	M. Herman, U. S. observer.*
Texarkana †	Miller	9	82.0	42.0	63.1	.50	M. J. Nash.*
Washington	Hempstead	30	89.0	50.0	67.0	6.62	A. H. Carrigan.*
Total average for the State			87.5	41.8	65.2	2.91	

*United States standard instruments. † Not counted in State average. ‡ No record.

Weekly crop bulletin of the Arkansas weather service in co-operation with the United States Signal Service for the week ending Saturday, July 28, 1888.

The volunteer observers of the Arkansas weather service have reported as follows for the week:

Rainfall.—The rainfall is generally below the average, and what has fallen has been distributed in a very partial manner. In some places local showers of over an inch extending over an area of a few miles, or even a few acres only. The crops are not, however, suffering to any great extent, although the uplands are becoming dry, and crops will soon show the effects of dry, hot weather.

Temperature.—The temperature has been about, or slightly above, the average, except in the southern counties, where it was below the average, especially at night. While slight complaints are made on this account, still it has not affected crops to any great extent, and the general excess of sunshine has helped to work out the grass from crops where not too far advanced for work.

REPORTS BY COUNTIES.

Arkansas.—Field crops not suffering, but gardens are for rain.
Ashley.—Crops fair, and will be a good yield if rains continue when needed.
Benton.—Crops needing some rain.
Boone.—Corn not well cultivated; is suffering for rain; other crops are not.
Bradley.—Cotton and corn far above average to date.
Chicot.—Past week favored cleaning out grass; rain not needed yet.
Dallas.—Crops beginning to suffer for rain.
Faulkner.—Corn and cotton favorably affected.

Fulton.—Very favorable weather for all crops.

Hempstead.—After so much wet the dry weather is very trying, but no actual suffering yet.

Hot Spring.—Bottom lands not suffering; high lands, planted late, will soon show distress without rain.

Johnson.—Corn very flattering; wheat turning out very well; considerable fruit being evaporated.

Lafayette.—Cotton forming and doing very well; fruit and sweet potatoes fine.

Lawrence.—Crops are very promising; watermelons in excess.

Logan.—Corn and cotton continue very fine; showers in county principally north.

Lonoke.—Crops in good condition except some late corn needs rain.

Madison.—Corn and vegetables need rain, but no serious damage yet.

Ouachita.—Cotton in places suffering for rain; local showers helping out.

Phillips.—Cool nights and hot days unfavorable; cotton out of grass; corn doing well.

Pike.—Corn and cotton excellent; millet good; fruit abundant; vegetables never better.

Pope.—Crops so tender from previous rains the hot sunshine is injurious to them.

Prairie.—All crops looking well; millet being harvested.

Pulaski.—Crops of all kinds very fine to date; local showers are doing good.

Randolph.—Corn and cotton very favorably affected.

Sevier.—Late corn needs rain, cotton doing well.

Union.—Cool nights and hot days not favorable to cotton; ground getting dry.

Van Buren.—Early corn safe; cotton well formed; crops to date were never better.

Washington.—Good weather for hay; a better crop never made; fruit above average.

Woodruff.—Corn never better; cotton excellent.

JOHN C. BRANNER,
Director, State Weather Service.
W. U. SIMONS,
Private, Signal Corps, Assistant.

[Inclosure III.]

COLORADO WEATHER SERVICE.

Bulletin of the Colorado Meteorological Association, May, 1888.

The following new stations appear in the present bulletin:

Stations.	Latitude.	Longitude.	Elevation.	Observers.
	° ′	° ′		
Buena Vista	38 50	106 10	7,960	W. H. Bradley, M. D.
Julesburg	40 58	102 10	3,440	Hiram Sapp.
Snyder	40 20	103 30	4,154	W. E. Wolfe.

At the beginning of the month an area of low barometer was passing from Wyoming through the northeastern part of this State into Nebraska, and thus the pressure in Colorado was reduced to the lowest point of the entire month, on the 1st or 2d day. Directly afterward the State was included in a wedge of high pressure extending from the north, which developed into a local high area on the 4th; and the latter, without much apparent motion, faded out and was replaced by a shallow *low.* On the 7th this *low* began moving east, being displaced by another arm of high pressure extending southward. The rise of pressure thus produced was at some stations the greatest of the month, but at Pike's Peak it was of minor importance, and everywhere of short duration. The pressure fell to the 10th, when a loop of the isobars connected Colorado with an area of less pressure in the north. The 10th may be considered the close of a period of precipitation, as comparatively little rain or snow fell afterward until the 15th, from which date until the end of the month, with the exception of two or three days (especially the 18th and 19th), rain was again frequent.

Between the 10th and 15th the pressure in Colorado was generally high, though a low area was situated in Texas on the 11th. But on the 15th a low area in the far northwest made a sudden sweep into Kansas, and was followed two days later by an-

other from Utah. After the depression of the 17th, a series of rapid, slight changes took place, no marked low areas being developed in this part of the country; although several slight depressions occurred and disappeared. The last of them, on the 26th, executed the most marked influence, and was succeeded by a considerable rise, which persisted through the closing days of the month.

The rainfall for the month was well distributed through its duration, there being no extended period of drought affecting the State at large. On the whole, its amount was slightly in excess of the normal, although Denver, Las Animas, and Pueblo, as well as Pike's Peak, report a deficiency. The latter is an instance of the defect in snowfall which has prevailed over the mountain region in general during the winter just closed, and which can hardly hardly fail to affect injuriously those sections which depend on irrigation.

The temperature has been cool for the season, and frosts occurred late in the month, as shown in the State summary.

Monthly summary of meteorological reports by voluntary observers of the Colorado Meteorological Association for May, 1888.

Stations.	Temperature.															Precipitation.			No. of days.			Monthly mean cloudiness.	Prevailing wind.			
	Means at			Monthly means.	Extremes.																		Directions.			
					Monthly means of			From self-registering thermometer.				From dry thermometers.														
	7 a. m.	2 p. m.	9 p. m.		Max.	Min.	Range.	Highest.	Date.	Lowest.	Date.	Highest at 2 p. m.	Date.	Lowest at 7 a. m.	Date.	Amount.	No. of days on which .01 inch or more fell.	Snow fall in inches and tenths.	Clear.	Fair.	Cloudy.		7 a. m.	2 p. m.	9 p. m.	Month.
Alma	37.6	44.6	33.9	37.5	48.8	25.5	23.3	62.6	14	19.0	7	61.0	14	22.7	7	.76	13	4.2								
Aspen	38.6	60.4	37.5	43.5								69.0	20	32.0	10, 17	3.42	15		8	13	10	5.3				
Buena Vista*	48.0	59.1	47.1	50.3	60.4	33.2	27.1	76.0	15	28.0	12	74.0	15	40.0	18	.69	6						W.	W.	W.	W.
Cañon City	54.9	69.4	58.2	60.2	72.9	43.8	29.1	88.0	14	34.5	12	85.0	14	42.0	7	1.16	8									
Climax	28.4	36.8	29.2	30.9								52.0	13, 14	16.0	7	1.91	16		11	13	7	5.4	N.	N.	N.	N.
Fort Collins	49.6	61.1	52.7	54.0	66.3	41.6	24.7	84.0	14	30.0	12, 18	79.0	14	36.0	7	4.62	12						N.	S.	N.	N.
Georgetown	42.0	51.5	43.0	44.9	53.9	36.8	17.1	69.0	14	27.0	7	68.0	14	30.5	7	2.83	17	8.0	12	15	4	3.3	SW., W.	SW.	N., W.	SW.
Glenwood Spr'gs	49.0	67.1	51.9	55.0	72.7	38.8	33.9	91.7	15	31.7	12	91.0	15	40.0	3	1.23	16		7	19	5	5.0	NE., SE.	NW.	NW.	NW.
Grand Junction	57.1	73.7	62.8	64.1	76.3	50.2	26.1	83.5	14, 15	40.0	7	88.5	14, 15	50.0	28	.17	2									
Hartsel	38.1	51.4	40.0	42.4	55.8	28.2	27.6	68.2	14	20.2	21	64.8	13	27.0	7	.83	3		9	19	3	3.9	W.	W.	W.	W.
Home†	32.5		31.9		48.8	25.5	23.3	82.0	30	21.0	12			29.0	11		2	0.8					W.	W.	W.	W.
Husted					65.4	39.3	26.1	79.0	19	31.0	7, 19					5.33	14		4	21	6	5.8				
Idaho Springs	†50.2	‡56.0	44.3	‖48.7	61.7	37.0	24.7	76.1	14	28.3	7	72.1	16	31.8	7	4.13	17		‡7	‡14	‡8		W.	E., W.	W.	W.
Julesburg	49.3	63.5	51.1	53.8	66.5	41.7	24.8	80.5	14	27.3	18	79.0	14	34.3	7	5.81	13		7	15	9	5.3	N., NW.	N.	N., SE.	N.
Longmont	†49.4	†60.2	52.5	‡53.2	†67.6	†40.6	†27.0	89.0	14	27.0	10, 12	88.0	14	34.0	7	4.11	10		6	14	11	5.9	N. E.	SE.	N.	N., NE.
Minneapolis	51.1	76.3	48.7	56.2								84.0	19, 21, 26, 30, 31	40.0	7	2.36	9		10	14	7	4.8	S. W.	SW.	SW.	SW.
Pandora		55.7		46.6	57.9	28.2	29.6	75.2	14	21.2	2, 3, 8, 11, 29	71.6	12, 13, 20				12	23.4								
Pueblo	51.8	68.3	57.2	58.6	72.6	44.8	27.8	86.5	14	36.0	12	85.0	14	43.0	12, 18	.69	8		20	10	1	2.8	W., NW.	E.	NW.	E.
Ranch near Como	35.1	47.0	36.8	38.9	50.5	28.6	21.9	61.9	14	20.4	7	61.8	14	24.8	7	1.66	14	13.9	6	17	8	5.2	W.	W.	W.	W.
Red Cliff	33.4	53.8	†37.1	†40.2								69.7	19	25.0	24	2.13	21	5.9	10	11	10	5.0	S.	SW.	S.	SW.
Saguache	46.6	64.7	44.7	50.2		32.1				27.0	18	78.0	13	38.0	7	.61	2						NW.	NW.	NW.	NW.
T. S. Ranch	55.9	66.4	55.2	58.2								80.0	15, 20	35.0	2	1.97	11		9	19	3	4.4	N.	W.	N.	N.
Thon	49.5	57.3	46.1	49.8	66.1			83.0	14	26.0	7	83.0	14	30.0	7	4.03	13		7	14	10	5.6	N., S.	N.	S.	S.
Trinidad	57.0	69.0	58.1	60.6								78.0	22	31.0	2		6						SW.	SW.	SW.	SW.
Walden	40.0	52.2	43.8	45.0	54.2	20.3	33.9	75.0	15	10.0	29	71.0	15	26.0	1	1.93	13		3	18	10	5.7	SW.	W.	W.	W.

* Record for 30 days. † Record for 25 days. ‡ Record for 29 days. ‖ Record for 28 days.

United States Signal Service stations.

Stations.	Barometer.		Temperature.				Extreme temperatures.							Humidity.		Wind.			Precipitation.			No. of days.			Average cloudiness.
	Actual pressure.	Reduced to sea-level.	Means at— 5 a. m.	1 p. m.	8 p. m.	Monthly mean.	Means of daily extremes. Maximum.	Minimum.	Range.	Highest.	Date.	Lowest.	Date.	Humidity.	Dewpoint.	Total movement (miles).	Mean hourly velocity (miles).	Prevailing direction for month.	Amount.	No. days on which .01 inch or more fell.	Amount snow in inches and tenths.	Clear.	Fair.	Cloudy.	
Cheyenne, Wyo.	23.944	29.897	40.0	55.0	47.7	47.6	60.4	36.6	23.8	78.0	14	27.0	7	59.9	30.9	7,970	10.7	N.	3.74	22	7.7	6	11	14	6.5
Colorado Springs	23.960	29.910	43.9	60.1	53.2	52.4	65.4	39.9	25.6	77.0	14	31.0	1	55.2	34.7	6,692	9.0	NE.	2.42	14	0.0	2	23	6	5.7
Denver	24.681	29.865	44.7	61.6	53.3	53.2	66.1	41.5	24.6	85.0	14	31.5	7	55.7	35.0	5,163	6.9	N.	2.66	16	0.0	7	15	9	5.6
Dodge City, Kans.	27.283	29.893	51.6	70.6	59.2	60.5	74.2	48.8	25.4	84.3	2	39.0	4, 18	68.6	48.4	10,791	14.5	SE.	2.86	9	0.0	11	16	4	4.0
Las Animas	25.928	29.808	48.1	70.5	59.9	59.5	73.6	45.5	28.1	87.2	14	35.3	18	49.3	37.2	6,857	9.2	E.	0.58	6	0.0	6	18	7	4.9
Montrose	24.205	29.978	45.5	63.4	56.5	55.1	68.5	41.6	16.9	81.2	14	32.2	8	47.6	32.7	4,768	6.4	SE.	0.84	5	0.0	7	17	7	4.9
Pike's Peak	17.735	29.895	18.4	25.4	20.0	21.3	28.5	16.1	12.4	39.5	14	6.7	3	81.1	16.0	16,915	22.7	W.	2.40	22	12.9	6	23	2	4.7
Santa Fé, N. Mex.	23.213	29.866	44.1	61.3	54.9	53.4	65.4	42.1	23.3	76.5	13	33.5	28	36.8	23.1	6,211	7.0	E.	0.70	5	0.0	11	17	3	3.9

Number hours sunshine during May, 1888.

[From Continuous Sunshine Record.]

Stations.	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.	20.	21.	22.	23.	24.	25.	26.	27.	28.	29.	30.	31.
Colorado Springs	6.00	2.30	10.30	7.00	3.00	0.00	4.10	10.15	6.00	4.00	13.45	12.00	13.30	8.15	6.00	7.05	6.00	6.45	8.45	7.30	7.30	10.30	1.45	8.10	5.15	4.30	0.45	12.40	9.45	7.00	8.15
Georgetown	9.45	3.00	5.15	7.15	0.30	0.15	0.00	6.30	5.10	5.00	8.30	10.45	10.45	10.45	10.15	6.00	7.15	8.00	10.15	7.30	3.30	4.55	5.00	8.30	5.00	5.00	0.10	4.15	8.30	3.45	10.15
Longmont	8.30	0.15	11.15	6.30	0.35	0.10	0.35	10.45	6.00	4.15	13.00	13.15	13.15	12.15	5.00	7.00	3.00	12.00	7.45	2.00	2.20	8.00	2.50	5.00	6.30	1.50	0.00	13.30	10.45	13.20	10.15
Pike's Peak	7.45	2.10	7.00	5.10	0.45	0.40	3.45	7.30	7.25	2.45	9.45	10.00	12.00	12.00	4.30	10.30	4.30	7.00	9.45	4.20	4.00	8.00	7.15	2.15	5.30	5.30	0.45	2.00	11.45	5.40	7.15

Mean temperature from thermograph record.

Stations.	2 a. m.	8 a. m.	2 p. m.	8 p. m.	Mean.
Alma	29.2	36.4	44.3	36.4	36.6
Colorado Springs	46.7	51.4	60.3	54.2	53.2
Denver	49.5	46.5	61.0	58.0	53.8
Pandora	36.9	48.4	55.7	45.4	46.6
Pike's Peak	19.3	20.7	25.9	21.4	21.8

Comparative temperature and precipitation for May.

Stations.	Temperature.				Precipitation.			
	No. of years.	Mean for previous years.	May, 1888.	Excess or deficiency.	No. of years.	Mean for previous years.	May, 1888.	Excess or deficiency.
Alma	2	41.8	37.5	—4.3	1	0.57	0.76	+0.19
Aspen	1	53.1	43.5	—9.6	.....	.....	3.42	.....
Canon City	1	62.4	60.2	—2.2	.....	.....	1.16	.....
Colorado Springs	11	55.3	52.4	—2.9	11	2.31	2.42	+0.11
Denver	16	56.2	53.2	—3.0	16	2.78	2.66	—0.12
Fort Collins	1	56.4	54.0	—2.4	1	0.94	4.62	+3.68
Georgetown	1	49.2	44.9	—4.3	1	1.17	2.83	+1.66
Glenwood Springs	1	64.5	55.0	—9.5	.....	.....	1.28	.....
Husted	.....	.....	.....	.....	2	1.60	5.33	+3.73
Idaho Springs	1	53.3	48.7	—4.6	1	0.31	4.13	+3.82
Las Animas	6	59.6	59.5	—0.1	6	2.45	0.58	—1.87
Longmont	1	60.1	53.2	—6.9	.....	.....	4.11	.....
Monte Vista	1	57.4	55.1	—2.3	1	0.50	0.84	+0.34
Pandora	1	46.6	46.6	0.0	.....	.....	.....	.....
Pike's Peak	14	22.6	21.3	—1.3	14	3.76	2.40	—1.36
Pueblo	1	63.1	58.6	—4.5	1	3.23	0.69	—2.54
Ranch near Como	3	44.1	38.9	—6.1	2	0.32	1.66	+1.34
Saguache	1	52.0	50.2	—1.8	.....	.....	0.61	.....
T. S. Ranche	1	61.1	58.2	—2.9	1	0.85	1.97	+1.12
Trinidad	2	60.6	60.6	0.0	.....	.....	.....	.....

STATE SUMMARY.

Atmospheric pressure (in inches).—Monthly mean, 29.98; maximum observed, 30.41, at Denver, on the 7th; minimum observed, 29.37, at Las Animas, on the 2d; range for State, 1.04.

Temperature (Deg. F.)—Monthly mean, 48.3; highest monthly mean, 60.6, at Trinidad; lowest monthly mean, 21.3, at Pike's Peak; maximum, 91.7, at Glenwood Springs, on 15th; minimum, 6.7, at Pike's Peak, on the 3d; range for State, 85.0; greatest local monthly range, 55.0, at Glenwood Springs; least local monthly range, 5.1, at Pike's Peak; greatest daily range, 55.0, at Glenwood Springs, on the 15th; least daily range, 2.0, on the 4th, at Climax.

Precipitation, including melted snow (in inches).—Average for the State, 2.38; greatest, 5.81, at Julesburg; least, .17, at Grand Junction.

Wind.—Prevailing direction, west.

Snow (dates of).—Akron, 2, 6; Alma, 2, 4, 5, 6, 7, 9, 10, 15, 16, 17, 21, 23, 27, 29, 30; Aspen, 2, 4, 5, 6, 7, 8, 17, 25, 26, 31; Buena Vista, 2; Castle Rock, 5, 9, 27; Climax, 4, 5, 6, 7, 8, 9, 10, 15, 16, 17, 22, 23, 24, 27, 28, 31; Denver, 6, 7; Forest Glen Farm, 2; Fort Lewis, 2; Georgetown, 2, 4, 5, 6, 7, 8, 21, 22, 23, 26, 27; Glenwood Springs, 2; Home, 5, 6; Husted, 2, 3, 27; Idaho Springs, 3, 5, 6, 7, 17; Julesburg, 7; Longmont, 5, 6, 7; Pandora, 2, 4, 5, 6, 7, 17, 27; Pike's Peak, 2, 3, 4, 5, 6, 7, 9, 10, 13, 16, 17, 18, 19, 21, 23, 25, 26, 27, 28; Ranch near Como, 2, 4, 7, 8, 16, 17, 22, 23, 26, 27; Red Cliff, 2, 3, 4, 5, 6, 7, 8, 10, 17, 21, 22, 23, 26, 27, 29, 30; Thon, 2, 6, 7, 27; Trinidad, 2, 6; Walden, 2, 4, 25, 27, 28.

Rain (dates of).—Akron, 2, 5, 6, 8, 9, 16, 21, 22, 23, 24, 26, 27; Alma, 15, 26, 27; Aspen, 2, 5, 6, 7, 8, 10, 19, 21, 22, 23, 28, 29; Beuna Vista, 6, 7, 9, 10, 16, 17, 18, 21, 22; Canon City, 5, 6, 7; Castle Rock, 2, 5, 9, 10, 14, 15, 17, 20, 21, 22, 23, 24, 26, 27; Colorado Springs, 2, 5, 6, 8, 15, 17, 18, 19, 20, 21, 22, 23, 24, 26, 27, 28, 30, 31; Denver, 2, 3, 4, 5, 6, 7, 8, 15, 16, 17, 20, 21, 22, 23, 24, 25, 26, 27, 28; Forest Glen Farm, 5, 6, 7; Fort Collins, 3, 4, 5, 6,

7, 8, 9, 10, 15, 16, 17, 20, 21, 22, 23, 25, 26, 27, 31; Fort Lewis, 27, 29; Georgetown, 4, 5, 10, 15, 17, 21, 23, 24, 30; Glenwood Springs, 3, 4, 5, 6, 7, 8, 9, 10, 15, 16, 17, 20, 21, 23, 25, 26, 27, 31; Grand Junction, 3, 7; Hartsel, 20, 21, 26, 30; Home, 5, 6, 31; Husted, 2, 3, 5, 6, 10, 15, 17, 18, 19, 20, 21, 23, 24, 26, 27, 28, 29, 30, 31; Idaho Springs, 2, 4, 5, 6, 7, 15, 17, 20, 21, 22, 23, 24, 25, 26, 29, 30; Julesburg, 2, 5, 7, 10, 11, 15, 16, 17, 18, 20, 21, 22, 23, 25, 27, 31; Las Animas, 5, 8, 21, 23, 26, 27, 28, 30; Longmont, 2, 4, 5, 6, 7, 10, 15, 16, 20, 21, 22, 23, 24, 25, 26, 27; Minneapolis, 2, 3, 5, 9, 16, 17, 21, 24, 30; Montrose, 2, 4, 5, 6, 7, 15, 17, 21, 26, 27, 29, 31; Pandora, 8, 18; Pueblo, 5, 6, 7, 17, 21, 23, 26, 27, 30, 31; Ranch near Como, 10, 15, 30, 31; Red Cliff, 4, 5, 6, 7, 8, 9, 10, 15, 16, 20, 21, 23, 25, 30, 31; Saguache, 6, 7, 15, 17, 27; Snyder, 20, 21, 22, 23, 24, 25, 26, 27; T. S. Ranch, 2, 5, 6, 7, 23; Thon, 5, 17, 21, 22, 23, 26, 27; Trinidad, 4, 5, 6, 7, 8, 9, 15, 16, 19, 20, 21, 22, 23, 29, 30, 31; Walden, 2, 5, 6, 7, 10, 13, 15, 16.

Sleet (*dates*).—Aspen, 2, 7, 8, 17; Pike's Peak, 23, 24, 30; Ranch near Como, 5, 6, 22, 25, 28, 30; Thon, 5, 6, 7.

Hail (*dates*).—Akron, 4, 26; Alma, 5, 15; Aspen, 5, 20, 25, 28; Castle Rock, 21; Colorado Springs, 30; Fort Collins, 23; Georgetown, 2, 21; Husted, 2, 23; Idaho Springs, 20, 22; Longmont, 24, 25, 27; Pike's Peak, 5, 15, 17, 20, 21, 22, 23, 24, 26, 29, 31; Red Cliff, 10, 23; T. S. Ranch, 6; Thon, 2, 21, 24, 25, 26.

Frost (*dates*).—Aspen, 24; Colorado Springs, 12, 19; Denver, 12, 18, 22; Husted, 4, 12, 18, 22, 24, 29; Julesburg, 8; Las Animas, 12, 18; Longmont, 3, 8, 12; Montrose, 3, 8, 18, 28; Pike's Peak, 16; Red Cliff, 3, 4, 7, 11, 12, 13, 14, 15, 18, 19, 20, 21, 22, 23, 24, 25, 26, 29, 30, 31; T. S. Ranch, 7, 8; Thon, 12, 18, 22, 24; Trinidad, 22; Walden, 29.

Fog (*dates*).—Akron, 17; Red Cliff, 6, 7, 8, 9; Thon, 26; Walden, 5.

Thunder storms (*dates*).—Akron, 2; Alma, 15, 21, 25; Aspen, 25; Castle Rock, 20; Colorado Springs, 5, 15, 17, 18, 19, 21, 23, 24, 30, 31; Fort Collins, 22, 25; Georgetown, 2, 22, 25; Glenwood Springs, 8; Idaho Springs, 29, 30; Julesburg, 10, 16, 20, 21, 31; Longmont, 15, 16, 21, 23, 24, 26, 27; Minneapolis, 24; Ranch near Como, 2, 4, 15, 22, 29, 30; Snyder, 20, 21, 25; Thon, 14, 21, 22, 23, 25, 26; Trinidad, 2, 15, 16, 20, 22; Walden, 15, 16.

Solar halo (*date*).—Las Animas, 6.

Lunar halo (*date*).—Pike's Peak, 22.

Parhelia.—T. S. Ranch, 9, 10.

Observers are specially desired to note and report to this office all phenomena bearing upon the advance of the season, as manifested in animal and vegetable life, the first appearance of different species of birds, insects and other animals, the leafing and blossoming of common trees and herbs, etc. Such notes will also be welcomed from any persons who may not be regular observers.

We desire, during this season, special reports on the condition of crops from month to month, with comparisons with previous years—the amount of irrigation done and notes on crops raised without irrigation. For the purpose of carrying out this feature of our work, we urgently request our observers and friends interested to bring the matter before the farmers in their vicinity, asking them to furnish us the data desired. They will be provided with the necessary forms, and copies of the bulletins containing their reports will be mailed them.

Observers are particularly requested to be prompt in sending in their records of observations, especially those which comprise the closing days of the month, in order that the bulletin may be prepared without unnecessary delay.

Volunteer observers wanted in every county.

To our readers desirous of consulting works on meteorology we recommend the following: The American Meteorlogical Journal (monthly), $2 per annum. A Treatise on Meteorology, by Prof. Elias Loomis; price $1.50. Weather, by Hon. Ralph Abercromby (just published), $1.75. Recent Advances in Meteorology, by Prof. William Ferrel (forming part of the Report of the Chief Signal Officer for 1885).

The Journal is the standard meteorological magazine of the United States. Professor Loomis' treatise has been the standard text-book on the subject for twenty years. The results of recent study are contained in the two latter works, of which Professor Ferrel's is strictly mathematical; the other (by a foremost English authority) is inductive in method and much easier to read. We shall be pleased to procure any of the above for our readers on receipt of the quoted price.

Correspondence in regard to observations, or to the display of weather signals, on the subject of membership in the Colorado Meteorological Association, or of contributions to its treasury, should be addressed to this office.

F. H. LOUD,
Director of Observations.
T. W. SHERWOOD,
Corporal, Signal Corps, Assistant.

COLORADO COLLEGE METEOROLOGICAL OBSERVATORY,
Colorado Springs, Colo., May, 1888.

[Inclosure IV.]

ILLINOIS STATE WEATHER SERVICE.

SPRINGFIELD, *July* 23, 1888.

DEAR SIR: In compliance with your request of the 5th ultimo, I have the honor to submit the following report of the operations of the Illinois State weather service during the year ending June 30, 1888.

This service has been in operation over ten years, and in fullness and efficiency of work will compare most favorably with any other service in the United States. It is controlled and supported by the State board of agriculture, and that without any special legislation or appropriation, and with comparatively little expense, considering the large amount of work done and the extent and character of the information furnished to the public.

Ten years ago but few observers could be secured and the extent of the work was necessarily limited. The interest in meteorology has, however, increased steadily, and now observing stations have been established in nearly all the counties in the State. At these stations the weather conditions are recorded daily, and are reported monthly to the central office at Springfield, where they are arranged, tabulated, and published in the Monthly Weather Review. It is expected that observing stations will soon be established in the few counties not yet occupied.

It has been a very difficult matter to find suitable parties willing to incur the expense for instruments and spend the time required to make observations and prepare reports. The frequent objections on this score urged by parties solicited to act as observers are now removed by the enterprise and interest manifested in the State weather service by General Greely, the Chief Signal Officer, who has kindly consented to lend instruments sufficient to equip stations in the unoccupied counties. Thus the reports of this service will soon represent every portion of the State, and be more complete during the coming year than heretofore.

The State covers such an extensive area from north to south (385 miles) that to meet the requirements of climatic conditions, which change rapidly in a north and south direction, the State has been divided into three divisions—the northern, comprising 33 counties, extending to and containing on the south the counties of Henderson, Warren, Knox, Peoria, Woodford, Livingston and Iroquois; so that its southern boundary approximates to latitude 40° 31′; the central, comprising 35 counties, extending thence south to and including the counties of Calhoun, Jersey, Macoupin, Montgomery, Shelby, Cumberland, and Clark, making its southern line approximate to latitude 39°; the southern, comprises the 33 remaining counties.

The following is a list of the names and addresses of the regular observers who reported during the year, and whose reports were used in making up the Monthly Weather Review:

Observer.	Post-office.	County.
D. E. Robbins	Payson	Adams.
C. L. Bozzell	Cairo	Alexander.
M. S. Oudyn, Ph. G	Greenville	Bond.
E. L. Lawrence	Belvidere	Boone.
Ezra Stetson	Neponset	Bureau.
Charles H. Beeler	Lanark	Carroll.
W. W. Gailey	Ashland	Cass.
H. A. Burr	Philo	Champaign.
C. L. Myers	Mahomet	Do.
J. K. Eberle	Pana	Christian.
J. B. Sheapley	Martinsville	Clark.
L. A. Michels	Flora	Clay.
William Rogan	Carlyle	Clinton.
William Dozier	Mattoon	Coles.
H. C. Frankinfield	Chicago	Cook.
John E. Templeton	Palestine	Crawford.
S. F. Wilson	Neoga	Cumberland
Roswell Dow	Sycamore	De Kalb.
Miss Mary Iles	Camargo	Douglas.
Royal T. Morgan	Wheaton	Du Page.
Wilbur T. Cook	Paris	Edgar.
B. F. Michels	Albion	Edwards.
George Strong	Eberle	Effingham.
Joseph Urbani	Vandalia	Fayette.
Fr. Dienelt	Melvin	Ford.
John McPherson	Benton	Franklin.
Miss Mary C. Bennett	Fairview	Fulton

Observer.	Post-office.	County.
Charles Carroll, jr	Shawneetown	Gallatin.
P. J. Bates	White Hall	Greene.
George W. Bartlett	Morris	Grundy.
William P. Gibbs	McLeansborough	Hamilton.
F. Z. Gosewich	Keokuk, Iowa	Hancock.
J. S. Abbott	Elizabethtown	Hardin.
R. Hodson	Oquawka	Henderson.
N. W. Thornton	Geneseo	Henry.
Henry Upsall	Watseka	Iroquois.
Frank Hopkins	Makanda	Jackson.
John B. Harris	Newton	Jasper.
A. M. Cheney	Jerseyville	Jersey.
Fr. Schaub	Galena	Jo Daviess.
M. M. Robbins	Aurora	Kane.
W. M. Wells	Kankakee	Kankakee.
J. S. Seely	Oswego	Kendall.
T. A. Wetmore	Oneida	Knox.
J. M. G. Carter	Waukegan	Lake.
L. R. F. Griffin	Lake Forest	Do.
J. O. Harris	Ottawa	La Salle.
J. A. Fyffe	Sumner	Lawrence.
Matthias Schick	Prairieville	Lee.
Isaac Young	Pontiac	Livingston.
L. H. Sullivan	Beason	Logan.
N. M. Baker	Decatur	Macon.
A. C. Gish	Virden	Macoupin.
J. L. R. Wadsworth	Collinsville	Madison.
J. L. Hallam	Centralia	Marion.
A. C. Price	Lacon	Marshall.
W. H. Williamson	Havana	Mason.
J. F. Culp	Mason City	Do.
J. D. Young	Pellonia	Massac.
Lon W. Rost	Macomb	McDonough.
John W. James	Marengo	McHenry.
George D. Silliman	Woodstock	Do.
W. O. Davis	Bloomington	McLean.
Tyler McWhorter	Aledo	Mercer.
S. F. Douglass	Renault	Monroe.
J. W. Potts	Raymond	Montgomery.
P. J. Hasenstab	Jacksonville	Morgan.
William Feary	Mount Morris	Ogle.
Fred Brendel	Peoria	Peoria.
J. A. Anderson	Three Mile	Perry.
J. W. C. Gray	Atwood	Piatt.
L. Eastman	Griggsville	Pike.
M. J. Hassler	Louisiana, Mo	Do.
J. E. Y. Hanna	Golconda	Pope.
B. C. Taber	Mound City	Pulaski.
A. T. Purviance	Hennepin	Putnam.
W. J. S. Cathcart	Jordan's Grove	Randolph.
Charles H. Fahs	Olney	Richland.
R. R. Martin	Davenport, Ia	Rock Island.
Gregg & Grace	Harrisburg	Saline.
John Craig	Springfield	Sangamon.
George C. Noyes	Camden	Schuyler.
Elihu Armitage	Exeter	Scott.
A. H. Hatch	Windsor	Shelby.
Edwin Butler	Toulon	Stark.
S. P. Chappel	Saint Louis, Mo	Saint Clair.
G. Leibrock	Mascoutah	Do.
John Wright	Cedarville	Stephenson.
J. E. Terborg	Pekin	Tazewell.
W. R. Jewell	Danville	Vermillion.
Miss C. J. Trego	Hoopeston	Do.
James Pool	Mount Carmel	Wabash.
J. C. Hutchison	Monmouth	Warren.
G. Tucker	Richview	Washington.
Jacob Hall	Fairfield	Wayne.
Miss Maud Alexander	Sterling	Whiteside.
A. Nash	Joliet	Will.
J. J. Fly	Pulley's Mill	Williamson.
J. L. Budlong	Rockford	Winnebago.

Some of the parties above named are new observers, but many have been reporting ever since the establishment of this weather service, and all have been doing efficient and commendable work. They have manifested a deep interest in the work of collecting and disseminating meteorological information of general interest to all classes, and the public has thereby become better educated on this subject, and received corresponding benefits therefrom.

The State Teachers' Association has manifested much interest in this work and has inaugurated a series of studies in this science that will tend to direct much attention to

its study in future. At the annual meeting of this body, held December 29, 1886, the following resolution was adopted:

"Whereas the science of meteorology is deservedly attracting more attention each succeeding year at the hands of educators; and

"Whereas the national and State signal services are collecting much valuable data of general interest to the public and especially to all engaged in teaching physical sciences; and

"Whereas the teachers of the State can derive much benefit from the signal service, and should render all possible aid in promoting the interest in this science: Therefore be it

"*Resolved*, That a standing committee of three be appointed by this association, on meteorology, and that the committee be instructed to co-operate with the Chief Signal Officer at Washington and the director of the State weather service at Springfield, in collecting and disseminating among the teachers of the State such information relating to the science of meteorology as may be of value to the educational interests."

Immediately after this action on the part of the State Teachers' Association the following circular was sent to all the teachers in the State:

"*Teachers of Illinois:*

"At the last meeting of the Illinois Teachers' Association the undersigned were appointed a committee to bring to the notice of the teachers of the public schools the benefits to be derived from systematic meteorological observations.

"The attention which the subject is receiving by the agricultural and commercial interests indicates its practical utility.

"Evidently a very useful training in some of the methods of physical science may be derived at trifling expense of money, time, and trouble, from the practice of regular and precise observations of the weather and of the indications of the thermometer, barometer, and other meteorological apparatus, and if to this be added the keeping of an exact and continuous record under the guidance and supervision of principals or teachers, still further interest and value will be given the exercise.

"The relation which this study bears to that of physical geography is such as to create a greater interest in the study, by bringing the pupils into an actual knowledge of the data from which are deduced the laws governing climatic conditions.

"The habits formed by the observation of the phenomena of nature and the awakening of the spirit of investigation, and the recording systematically of its facts, all tend to commend the subject to the favorable attention of the educators of the State.

"The limits of the work need not stop at observation upon meteorological conditions, but can probably be extended to recorded observations upon the migratory flight of birds; the appearance of insect and vegetable life; the leafing of the trees; the blooming of the flowers, with notes upon their progressive development and disappearance, together with all other like phenomena; making a record to be continually referred to with increasing interest and profit, by not only the pupils, but the community, and forming habits which will go out with them into life.

"As an encouragement to this work, the State weather bureau, acting in concurrence with the U. S. Signal Service, will furnish to all applicants blanks for the registration of observations, and will gladly receive and collate for publication in the Monthly Weather Review all carefully made records, thus making the school weather reports a part of the general system of meteorological work of the State and county. Such an arrangement will no doubt greatly stimulate the interest of both pupils and teachers and must tend to make the work more exact and methodical.

"Without attempting to prescribe a detailed mode of organization for the purpose, this committee would suggest the advisability of dividing the work of observation among the more advanced and reliable pupils, so as to interest in it as large a number as possible without over burdening any. In order that occasional absence of a regular observer may not affect the record, it would be well to appoint an alternate for each, to act only in the absence of the principal.

"All observations taken to be reported to a recorder and by him to be entered in a suitable book.

"S. A. FORBES,
"BUEL P. COLTON,
"C. J. LEMEN,
"*Committee.*"

The following circular was also sent from this office to all the principals of schools in the State:

"DEAR SIR: The following is a copy of a preamble and resolution adopted at the annual meeting of the Illinois Teachers' Association held at Springfield, December 29, 1886:

"'Whereas the science of meteorology is deservedly attracting more attention each succeeding year at the hands of educators; and

"'Whereas the national and State signal services are collecting much valuable data of general interest to the public and especially to all engaged in teaching physical sciences; and

"'Whereas the teachers of the State can derive much benefit from the signal service, and should render all possible aid in promoting the interest in this science: Therefore be it

"'*Resolved*, That a standing committee of three be appointed by this association, on meteorology, and that the committee be instructed to co-operate with the Chief Signal Officer at Washington, and the director of the State weather service at Springfield, in collecting and disseminating among the teachers of the State such information relating to the science of meteorology as may be of value to the educational interests.'

"Inclosed you will find copy of the report prepared by the committee appointed by the State Teachers' Association to consider and recommend a plan for increasing the interest of the scholars attending the public schools of the State in the science of meteorology.

"It is hoped that you will be sufficiently interested in this matter to co-operate with the Signal Service of the United States, as well as the Illinois State weather service, in extending the benefits of this science to the pupils under your charge.

"In case you conclude to assist in carrying out the work outlined in the inclosed circular by the committee of the Illinois Teachers' Association, be kind enough to fill out the appended blank and return it in the inclosed franked envelope.

"Yours, truly,

"CHARLES F. MILLS,
"*Director Illinois Weather Service.*"

In response to the above circular a large number of replies were received from principals in the various counties who consented to co-operate with this service; the following is a list, according to counties:

Adams.—J. A. Califf, Lima; J. K. Smith, La Prairie; J. W. Creekmur, Camp Point.

Bond.—Robert Thacker, Sorento; J. C. Blizzard, Dudleyville.

Boone.—J. G. Lucas, Belvidere; J. C. Zinzer, Belvidere.

Carroll.—Aaron Palmer, Savanna.

Cass.—John D. Pace, Arenzville.

Champaign.—Theo. E. Walker, Gifford; J. G. Lawrence, Philo; J. M. Oakwood, Thomasborough.

Christian.—I. C. Baker, Taylorville; D. O. Witmer, Taylorville; J. W. Carle, Edinburg.

Clay.—A. M. Rose, Ingraham.

Clinton.—Arthur Oehler, Trenton.

Coles.—O. F. McKim, Ashmore; John Snyder, Oakland; J. W. Jones, Humboldt.

Cook.—Charles A. Cook, Irving Park; James Hannan, Chicago (Lake High); F. J. Mooney, Lyons; H. B. Allen, 280 Rumsey street; Henry L. Boltund, Evanston; J. W. May, Hyde Park; Lina E. Troendle, Lake View; Francis W. Parker, Normal Park; F. W. Nichols, South Evanston; Charles D. Huxley, South Chicago; A. F. Nightingale, 1734 Diversey street; W. E. Vanderwater, Bloom; H. L. Merrill, Palatine; E. L. Morse, South Chicago (89th street); J. M. Hupp, Fernwood; T. C. Hill, Kensington; G. A. Brennan, Roseland; W. H. Ray, Hyde Park; Kate McCartney, Havelock.

Crawford.—W. A. Swaren, Oblong; L. E. Murray, Palestine.

De Kalb.—J. L. Curts, DeKalb; A. J. Ladd, Shabbona; H. S. Earley, Hinckley.

De Witt.—S. Stackhouse, Wapella; W. W. Hardin, Weldon.

Douglas.—E. H. Owen, Arcola; George O. Moore, Newman.

DuPage.—C. C. VanLien, Bensenville; J. K. Rassiveiler, Wheaton; Charles H. Ostrander, Naperville.

Edgar.—A. Harvey, Paris.

Effingham.—Charles Combs, Shumway.

Fayette.—H. Henderson Stine, St. Elmo.

Ford.—A. C. Rishel, Gibson City; Koscie Clinebell, Sibley.

Fulton.—Milton M. Cook, Fairview; J. N. Shippey, Astoria; E. E. Douglas, Ipava.

Gallatin.—M. E. Fulk, Ridgway; H. C. Smith, New Haven.

Greene.—G. W. Smith, White Hall; J. S. Deck, Roodhouse; David Felmley, Carrollton.

Grundy.—R. D. Fuller, Mazon; L. T. Regan, Morris.

Hamilton.—A. E. Todd, Belle Prairie; J. M. Biggerstaff, McLeansboro.

Hancock.—Lionel Fairfax, Dallas City; S. Ensminger, Augusta; J. A. Souders, Hamilton; J. R. Allan, Carthage.

Hardin.—James N. Derr, Biggsville; Mrs. F. E. Boden, Oquawka; W. V. English, Carman.

Henry.—E. C. Rosseter, Kewanee; John McClenahan, Galva.

Iroquois.—Lyon Karr, Loda; Theo. H. Haney, Onarga; C. C. Wilson, Cissna Park; P. J. Kuntz, Sheldon.

Jasper.—Zillman Jones, Vale; May Taylor, West Liberty; N. S. Scovell, Newton.

Jersey.—J. Pike, Jerseyville.

JeDaviess.—A. E. Knuckey, Elizabeth; John W. Wilcox, Scales Mound; E. A. Fritter, Warren.

Johnson.—D. J. Cowan, Vienna; C. C. Cross, New Burnsides.

Kane.—O. T. Snow, Batavia; F. L. Morris, Elburn; R. McCay, Elgin; John M. Raymond, St. Charles.

Kankakee.—F. N. Tracy, Kankakee; J. N. Mercer, Manteno.

Kendall.—J. N. Wayman, Yorkville; A. D. Curran, Bristol.

Knox.—W. H. Givler, Wataga.

La Salle.—William Jenkins, Mendota; J. P. Yoder, Marseilles; L. J. Quantrell, Earlville; R. Williams, Streator.

Lawrence.—Effie Heath, Sumner.

Lee.—E. C. Webster, Dixon.

Livingston.—Edward Bangs, Fairbury; C. E. Schlabach, Chatsworth; H. D. Fisk, Dwight.

Logan.—W. T. Bromfield, Lincoln.

Macoupin.—J. O. Kennedy, Staunton.

Madison.—Rudolph von Pfleger, Venice; R. A. Haight, Alton; J. Y. Pearce, Alhambra; Wm. L. Tarbet, Alton; J. G. Reynolds, Wanda; Theo. Adelman, St. Jacobs; L. T. Kennedy, New Douglas.

Marion.—M. M. Merriman, Patoka; J. H. Brinkerhoff, Salem; R. J. Moore, Centralia.

Marshall.—J. E. W. Morgan, Wenona.

Mason.—J. A. McComas, Manito; W. H. Smith, Mason City.

Massac.—J. M. Helm, Samoth; J. F. Nicholson, Metropolis City; J. F. Hight, Samoth; D. B. Kerr, Metropolis City.

McDonough.—C. A. Head, Bardolph.

McHenry.—J. A. Sheldon, Huntley; S. M. Grimes, Nunda.

McLean.—M. V. Zimmerman, Belle Flower; C. L. Howard, Saybrook.

Menard.—H. M. Steidly, Greenview; S. McBride, Petersburgh.

Mercer.—A. L. Atwood, Keithsburgh; E. E. Law; Millersburg; G. N. Kneeland, Aledo.

Monroe.—J. R. Walker, Columbia.

Morgan.—Geo. M. Oakman, Meredosia; J. G. Patterson, Jacksonville.

Moultrie.—J. J. Wilkinson, Lovington.

Ogle.—R. W. Burton, Polo; Horace G. Kauffman, Mount Morris; G. N. Maxwell, Byron.

Perry.—A. T. Stone, Old DuQuoin.

Piatt.—J. T. Reeves, Cisco; Frank Colegrove, Mansfield.

Pike.—Robt. L. Underwood, Perry; W. O. Binns, New Salem; J. B. Gragg, Time.

Pope.—J. W. Hodge, Eddyville; C. F. Philbrook, Golconda.

Pulaski.—C. W. Wynant, Mound City; P. P. Bennett, Olmsted; B. F. Sewell, Pulaski; I. M. Taylor, Villa Ridge.

Rock Island.—Jerome McNeill, Moline.

Saline.—N. B. Hodsdon, Harrisburgh; J. R. Youngblood, Stone Fort.

Sangamon.—E. W. McDaniel, Chatham; J. H. Collins, Springfield.

Scott.—Henry Higgins, Naples; Wm. Gay, Winchester.

Shelby.—Mrs. J. W. Fuller, Oconee; C. H. Thrailkill, Cowden.

Stark.—P. J. Rennick, Castleton; G. W. Henry, Bradford; J. H. Broomall, Toulon; J. F. Reed, LaFayette.

Saint Clair.—Arthur O'Leary, East Saint Louis; Aug. Gierschner, New Athens; Chas. H. Kammann, Mascoutah; C. B. Carroll, East Saint Louis; H. B. Frein, Smithton; J. W. Farmer, West Belville.

Tazewell.—F. H. Lormer; Hopedale; W. I. Dickson, Bradley; C. L. Farrington, Pekin; J. S. Cole, Minier; G. W. Warner, Mackinaw; J. L. Hartwell, Washington.

Union.—John J. Ferrill, Cobden; John W. Wood, Cobden; M. V. Baggott, Jonesboro.

Vermilion.—David Mead, Danville.

Wabash.—G. L. Guy, Mount Carmel; C. C. Harper, Mount Carmel.

Warren.—I. C. Stockton, Kirkwood; J. N. Cox, Alexis.

Washington.—C. B. Gudgeon, Elkhorn; J. L. Frohoc, Ashley.

Wayne.—B. Loor Seneff, Mount Erie; W. B. Davis, Fairfield.

Whiteside.—A. Bayliss, Sterling; F. F. Harding, Sterling; F. S. Johnson, Tampico; Will J. Johnson, Prophetstown; R. V. DeGroff, Fulton.

Will.—Aug. Maue, Mokena; D. Muir, Frankfort Station; George B. McClelland, Channahon; Charles Curtis, Lockport; C. W. Minard, Wilmington.

Williamson.—James W. Turner, Crab Orchard.

Winnebago.—W. W. Austin, Rockton.

Woodford.—T. J. Robson, Secor; Thomas E. Cleland, Washburn; M. P. Lackland, Roanoke.

Several of the above-named gentlemen have furnished reports which have been published in the Monthly Weather Review.

The Monthly Weather Review, published by this office, continues growing in value, popularity, and amount of matter contained therein. It is now a neat pamphlet of about forty pages, containing a general summary of the weather, remarks of observers giving items of local interest, and numerous tables embracing all the weather conditions of the month of which it is a record. Two thousand copies are published and distributed monthly through the State. This work is greatly facilitated by the kindness of the Chief Signal Officer, who has detailed an experienced observer of the Signal Service to act as assistant to the director. Sergeant James Cassidy, now assisting the director in this work, has rendered this office efficient and valuable service in connection therewith.

Another publication of this office is the Weekly Crop Bulletin, which is issued in conjunction with the Crop Bulletin now being published by the Chief Signal Officer. This Bulletin is issued from this office every Saturday, and reports the condition of the temperature, rainfall, and sunshine for the preceding week, as well as the effect of the weather on vegetation and farming operations generally. These weekly reports give the fruit prospects, the condition of the various crops, the live stock, and other matters of general interest to the producer and consumer. The services of the regular crop reporters, as well as the regular observers of the weather service, are called upon for the information which is summarized in this bulletin, which is compiled from eighty to one hundred reports received on Saturday of each week during the crop season. Upon receipt of these weekly reports the information is tabulated, and the results embodied in a circular, which is printed on an Edison mimeograph (inclosed is a copy of last Saturday's issue) and five hundred copies are at once mailed to all the principal newspapers through the State, and to the Associated Press, which telegraphs it to the principal papers of the country. It is thus very widely distributed, being quite generally published by the metropolitan dailies and in the live-stock and agricultural press.

The weather forecasts or indications have also been telegraphed daily (except Sundays), at the expense of the Government, to the leading points in the State, and have been highly appreciated by our citizens generally. The following is a list of places receiving such indications, as well as the names of the displaymen who display the usual flags for the information of the public:

Name of displayman.	Place.	County.
George W. Cyrus	Camp Point	Adams.
J. Stern & Sons	Quincy	
M. S. Oudyn	Greenville	Bond.
C. P. Mason	Buda	Bureau.
L. G. Burrows	Lanark	Carroll.
S. A. Fasig	Martinsville	Clark.
M. Kahn & Co.	Mattoon	Coles.
P. Walker	Robinson	Crawford.
McIntosh & Son	Clinton	DeWitt.
J. C. Jewell	Tuscola	Douglas.
Paris Republican	Paris	Edgar.
H. Weichelman	Effingham	Effingham.
Jos. Urbani	Vandalia	Fayette.
P. A. Coal	Gibson City	Ford.
J. W. Lambert	Paxton	
John McPherson	Benton	Franklin.
A. C. Atherton	Lewistown	Fulton.
James P. Morrow	Carrollton	Greene.
George W. Bartlett	Morris	Grundy.
J. R. Campbell	McLeansborough	Hamilton.
Jos. A. Spangler	Carthage	Hancock.
E. E. Fitch	Galva	Henry.
Henry Upsall	Watseka	Iroquois.
Fr. Schaub	Galena	Jo Daviess.
W. A. Mansfield	Elgin	Kane.
Holmes Miller & Sons	Aurora	
M. Steifel	Ottawa	La Salle.
R. H. Ruggles	Mendota	
G. W. Barr	Bridgeport	Lawrence.
W. L. Foote	Dixon	Lee.
Wade Brothers	Fairbury	Livingston.
John Irwin	Decatur	Macon.
J. W. Lumpkin	Carlinville	Macoupin.
Samuel Hays	Alton	Madison.
London Clothing Company	Centralia	Marion.

Name of displayman.	Place.	County.
R. L. Buchanan	Lacon	Marshall.
Journal Printing Company	Macomb	McDonough.
A. S. Wright	Woodstock	McHenry.
W. O. Davis	Bloomington	McLean.
John W. Edwards	Aledo	Mercer.
N. S. Cowen	Litchfield	Montgomery.
George H. Ades	Byron	Ogle.
Comstock, Avery & Co	Peoria	Peoria.
Romeo Friganza	Mound City	Pulaski.
C. & W. Eddy	Hennepin	Putnam.
C. S. St. Vrain	Chester	Randolph.
F. M. Bourell	Olney	Richland.
Gregg & Grace	Harrisburg	Saline.
A. H. Hatch	Windsor	Shelby.
Curt Heinfelden	Belleville	Saint Clair.
Joe. Emmert	Freeport	Stephenson.
B. C. Allenworth	Pekin	Tazewell.
John Buck	Cobden	Union.
Smith & Dunbar	Monmouth	Warren.
F. B. Loenard	Joliet	Will.

The Illinois State weather service has constantly increased in popularity with the general public since its organization in 1877, and the importance to all classes of the meteorological data collected and published in connection therewith is not questioned by any one familiar with the same.

Respectfully submitted.

CHARLES MILLS,
Director, Illinois Weather Service.
JAMES CASSIDY,
Sergeant, Signal Corps, Assistant.

The CHIEF SIGNAL OFFICER,
Washington, D. C.

ILLINOIS CROP PROSPECTS.

DEPARTMENT OF AGRICULTURE,
Springfield, July 21, 1888.

The crop correspondents of the State department of agriculture, the signal service, and the county observers of the Illinois State weather service, representing all portions of the State, have made the following report for the week ending July 21, 1888, to the secretary of the State board of agriculture concerning the weather and the condition of the growing crops:

Temperature.—The mean temperature has not been up to a seasonable average during the past week. The prevailing humidity of the atmosphere and sunshine have made the conditions for farming operations.

Rainfall.—The precipitation during the past month has been ample for growing crops in nearly all portions of the State, and notwithstanding the limited rainfall during the past week the localities needing rain are the exception.

Sunshine.—There has been a seasonable amount of sunshine during the past week and the conditions have been favorable for the growth and the harvesting of the crops.

Corn.—In all excepting a few counties the condition of corn is up to a July average. This crop is making rapid and satisfactory growth except in some of the southeast counties, where the chinch-bugs are present in large numbers.

Oats.—This crop is being harvested in many of the central counties at great disadvantage and loss, and where so badly lodged will not make half an average yield per acre. The quality is good.

Winter wheat.—The crop is generally in shock, and some thrashing has been done. The yield per acre in the central portion of the State will be about up to an average; the quality is from medium to poor. There is considerable complaint of wheat sprouting in the shock in central Illinois, where the rains have been heavy and frequent since the beginning of harvest. There will be nearly an average yield per acre of spring wheat in the northern counties.

Meadows.—The hay crop will be larger than expected, and the late cutting is being saved in better condition than that harvested early this season.

Pastures.—Grass has made good growth since the general rains, and, excepting in some of the southern and a few of the northern counties, is not needing rain.

Rye.—This crop has generally been saved in good condition, and the yield is per acre up to the average.

Fruit.—The fruit prospects are very good in the southeastern portion of the State, and in other sections there will be a larger crop of apples and small varieties of fruit than for some years past.

C. F. MILLS,
Director.
JAMES CASSIDY,
Sergeant, Signal Corps, Assistant.

[Inclosure V.]

INDIANA SIGNAL SERVICE.

PURDUE UNIVERSITY,
La Fayette, Ind., July 3, 1888.

SIR: I have the honor to make the following report in regard to the operations of the Indiana signal service for the year ending June 30, 1888: The number of observers has increased from twenty-six in 1887 to thirty-one at present. The reports received are more complete and come in more promptly than formerly. The increase in observers is in the northern counties, where they were the most needed. A regular monthly bulletin of twelve pages is published, containing the results of observations by observers, comparative tables of temperature and precipitation at various State stations from five to thirty-four years, and comparative tables of atmospheric pressure at various stations from nine to twenty-seven years. The bulletin also contains a list of places at which the Cincinnati, Indianapolis, Saint Louis and Chicago Railway Company have established stations for observations of temperature and state of the weather. These stations are eight in number, and the result of their observations are published in the bulletin. The most gratifying feature of the year's work is the progress made in establishing stations at which weather signals are displayed. There are one hundred and thirty-nine telegrams sent to such stations daily, and as in a number of cases one telegram is made to serve two or more stations, there are about one hundred and fifty display stations in the State.

The Cincinnati, Indianapolis, Saint Louis and Chicago Railway Company also display weather signals on the side of their baggage cars.

A list of display stations, displaymen, and co-operating railway companies is given below.

List of signal service display stations established by the Indiana State weather service where weather and temperature symbols are displayed.

[These places receive the weather indications daily, except Sundays, at Government expense, at 7 a. m., and the flags displayed indicate the probable features of the state of weather and temperature for the space of twenty-four hours from that time. Prior to a probable sudden and great fall in temperature the cold-wave signal is also displayed at these stations.]

Displayman.	Place.	Displayman.	Place.
A. Marks & Son	Madison, Ind.	J. M. Bradford	Frankfort, Ind.
S. D. Symmes	Crawfordsville, Ind.	Swain & Swain	Bluffton, Ind.
O. G. Boerner	Vevay, Ind.	John A. Forsythe	Seymour, Ind.
Cronbach & Bro	Mount Vernon, Ind.	George P. Moog	Huntingburgh, Ind.
Peter Lichtenfels & Co	Richmond, Ind.	W. S. Martin	New Albany, Ind.
C. C. Oakey	Terre Haute, Ind.	Branham & Co	Indianapolis, Ind.
Frank Weikle	Lawrenceburgh, Ind.	A. M. Kuhn & Co	Do.
J. E. Allen & Co	Greencastle, Ind.	H. E. Agar	Hazleton, Ind.
Conway & Childs	Greensburgh, Ind.	Thomas A. Starr	Goshen, Ind.
A. R. Wayman	New Castle, Ind.	George Russell	Irvington, Ind.
Q. J. Noblitt	Columbus, Ind.	John A. Polk	Greenwood, Ind.
Dimick, Helera & Lewis	Princeton, Ind.	William Banes	Metamora, Ind.
A. C. Bates	Rockville, Ind.	E. C. Smith	Frankton, Ind.
I. D. Phelps	La Porte, Ind.	Buck & Harrold	Clay City, Ind.
J. W. May	Salem, Ind.	R. H. Edmunds	Plainfield, Ind.
The Gazette Company	Washington, Ind.	William Fultz	Crothersville, Ind.
Fire Department	La Fayette, Ind.	P. W. Fair	New Era, Ind.
Merchants' Exchange	Evansville, Ind.	S. E. O'Neel	Dupont, Ind.

List of signal service display stations established by the Indiana State weather service where weather and temperature symbols are displayed—Continued.

Displayman.	Place.	Displayman.	Place.
B. F. Clark	Zionsville, Ind.	Walter Bradfute	Bloomington, Ind.
L. S. Myer	Flora, Ind.	H. Green	Chesterton, Ind.
L. E. Mace	Lexington, Ind.	Bennett Brothers	Monticello, Ind.
D. Longnecker	Crown Point, Ind.	Beyer Brothers	Warsaw, Ind.
L. B. Fisher	Rossville, Ind.	Tripp Brothers	North Vernon, Ind.
M. L. Moon	Brooklyn, Ind.	A. F. Bridges	Brazil, Ind.
B. F. Bridges	Rockport, Ind.	A. W. Bruner	Paoli, Ind.
G. W. Bass	Mooresville, Ind.	John B. Tyre	Wabash, Ind.
G. S. Durham	Russellville, Ind.	M. W. Moore	Huntington, Ind.
A. E. Johnson	Liberty, Ind.	French & Bramble	Kentland, Ind.
W. H. Albough	Colburn, Ind.	R. S. Phipps	Camden, Ind.
David Overman	Marion, Ind.	J. M. Rhodes	Winthrop, Ind.
J. C. Loomis	Jeffersonville, Ind.	S. Grondyke	Eugene, Ind.
D. McDuffie	Plymouth, Ind.	W. A. Burton	Mitchell, Ind.
Geo. W. Scearce	Danville, Ind.	R. S. Drummond	Oaktown, Ind.
G. W. Campbell	Pendleton, Ind.	Kies Brothers	Elkhart, Ind.
S. B. Davis	Newport, Ind.	David E. Lowe	Foresman, Ind.
Allen Morrison	Bloomingdale, Ind.	R. McDougall	Auburn, Ind.
Benj. Hole	Bridgeport, Ind.	P. W. Corya	Moore's Hill, Ind.
Samuel Loucks	Tipton, Ind.	Milo Bright	Akron, Ind.
G. B. Henderson	Marshall, Ind.	J. Keiser	Michigan City, Ind.
Sim. Pollard	Campbellsburgh, Ind.	The Bulletin Company	Anderson, Ind.
G. W. Reeve	Rushville, Ind.	Homer Fisher	Orleans, Ind.
C. F. Heim	Marco, Ind.	Locke Ferree	Milroy, Ind.
J. P. Key	Patoka, Ind.	W. R. Dunham	Kempton, Ind.
Newhous & Bro	Lawrence, Ind.	L. O. Bishop	Clinton, Ind.
Wainwright & Co	Noblesville, Ind.	Halderman & Johnson	Roann, Ind.
W. B. Squire	Worthington, Ind.	Coppock & Oram	Goodland, Ind.
M. D. Harry	Sulphur Springs, Ind.	Keil Brothers	Fort Wayne, Ind.
M. C. McCormick	Argus, Ind.	Will Haselton	Kokomo, Ind.
M. V. Bowman	Atkinson, Ind.	J. Gardner	Westville, Ind.
J. H. Thornburg	Lynn, Ind.	J. A. Lewis	Martinsville, Ind.
O. H. Nixon	Spiceland, Ind.	Park & Ervin	Scottsburgh, Ind.
J. H. Barbour	Teagarden, Ind.	J. M. Winkley	Monon, Ind.
Frank Lowry	Granger, Ind.	J. E. Walker	Sheridan, Ind.
S. T. McGovney	Portland, Ind.	W. L. Day	Laurel, Ind.
J. M. Taylor	Dana, Ind.	J. Ganser, jr	Mishawaka, Ind
J. M. Israel	Franklin, Ind.	T. A. Huston	Fortville, Ind.
S. B. Morris	Shelbyville, Ind.	J. S. Cole	Albany, Ind.
W. J. Davisson	Farmland, Ind.	S. M. Burns	Brookston, Ind.
Z. T. Crawford	Glenwood, Ind.	William Collins	Lowell, Ind.
John Corbin	New Harmony, Ind.	J. N. Adams	Reynolds, Ind.
J. G. Snapp	Carlisle, Ind.	Bruce Swallow	College Corner, Ohio.
G. E. Marshall	Rensselaer, Ind.	Carpenter Brothers	Kendallville, Ind.
Puterbough Brothers	Peru, Ind.	J. N. Spencer	Covington, Ind.
G. W. Jewell	Earl Park, Ind.	A. S. Peacock	Attica, Ind.
A. Russell	Red Key, Ind.	J. A. Wertz	Galveston, Ind.
Jacob Kennedy	Montclair, Ind.	F. C. Runkle	Edinburgh, Ind.
C. J. Hopkins	Remington, Ind.	J. A. Ridge	Gosport, Ind.
E. G. Binsford	Carmel, Ind.	A. S. Hale	Angola, Ind.
J. H. Barr	Roanoke, Ind.	Dalton Hinchman	Vernon, Ind.
Tribune Company	South Bend, Ind.		

The following railroad companies sent the indications, cold-wave signal, local storm and heavy snowfall messages to depots on their roads: Cleveland, Columbus, Cincinnati and Indianapolis Railway; Indiana, Bloomington and Western Railway; Cincinnati, Indianapolis, Saint Louis and Chicago Railway; Pennsylvania Railroad Company; Louisville, Evansville and Saint Louis Railway; Indianapolis, Decatur and Springfield Railway.

The Cincinnati, Indianapolis, Saint Louis and Chicago Railway displays the weather symbols on trains.

A weekly crop bulletin is issued and is meeting with much favor among business men. Arrangements are being made to provide for a wider distribution of this bulletin than has been possible in the past.

In October, 1887, Mr. James Cassidy, who had been detailed to act as assistant, was transferred, and Mr. C. F. R. Wappenhans was detailed to fill his place. The success of the service is very largely due to the interest and energy displayed by these two gentlemen.

I would also acknowledge the valuable service rendered by Capt. J. B. Conner, of the Indiana Farmer, in the work of obtaining an increase in the number of telegrams furnished to this service.

To the United States Signal Service we are indebted for the use of instruments, for blank forms, assistants, telegrams, and other aid. These favors are hereby gratefully

acknowledged. Experiments are now being carried on in the hope of finding a material for flags that will be more durable than that now in use.

Very respectfully, your obedient servant,

H. A. HUSTON,
Director.

First Lieut. H. H. C. DUNWOODY,
Acting Chief Signal Officer, Washington, D. C.

WEATHER CROP BULLETIN OF THE INDIANA WEATHER SERVICE IN CO-OPERATION WITH THE SIGNAL SERVICE.

INDIANAPOLIS, *September* 15, 1888.

No rain fell during the past week except light local rains in the extreme southern portion of the State. The temperature during the first part of the week was above and during the latter part much below normal, with light local frosts on the 13th and 14th. Much sunshine prevailed and assisted materially in ripening corn, which is now nearly everywhere out of danger from heavy frosts and is being cut and put up in shocks, except perhaps in the extreme southern part of the State, where the very heavy rains during August retarded the ripening of the plant, causing it still to be green and milky in some fields, but after a very few days this will be out of danger and an immense and excellent crop is assured. Fall pasture in the southern portion of the State is in very fine condition, but in the central and northern portions it needs much rain. The condition of the weather was very favorable for sowing wheat; in some fields has come up and looks well.

In the southeast part of the State large quantities of tobacco have already been cut, and it is curing favorably. With about two weeks of clear, warm weather the remaining crop will be safely secured.

Worthington.—Corn is now safe from frost and has ripened sufficiently for cutting. Many are putting corn in shock. It is too dry for the turnip crop. Wheat is being put in rapidly. No rain.

Seymour.—The weather during the week has been very favorable for the maturing of the corn crop, also for wheat sowing. At least 85 per cent. of the corn crop is so far matured as to be out of danger from frost. Another week and all will be safe. The area to be sown to wheat is 8 per cent. above the average. Much is already sown, and some is up and growing finely, the ground being in fine condition. Very light frost on the morning of the 14th. No rain.

Vevay.—The crop conditions during the past seven days have greatly improved. After copious rains on the 7th and 8th, clear weather has prevailed, agitated by fresh northeast winds. Evaporation has been rapid, causing corn to ripen and dry fast, most of which has already hardened sufficiently to resist moderate frost. Large quantities of tobacco have been cut and is curing favorably. With two weeks clear, warm weather the crop will be safely secured. It is an immense crop, and if successfully cured will command high prices. The soil being in fair condition, considerable wheat is sown. The pasture continues fresh and green and live-stock is in fine condition. Rainfall, 1.25 inches.

Crawfordsville.—It is very dry. Corn is being gathered. Frost on Wednesday and Thursday nights. No rain.

Mauzy.—Wheat is mostly sown; that put in earlier is up and looking well. We need more warm weather to ripen corn. Frost on the 14th. Rainfall, .11 inch.

Franklin.—Frost on the 13th and 14th. No serious damage, but it will show on tender vegetation. The ground is very dry and rain much needed. No rain.

Butlerville.—Farmers are sowing wheat. This will be the largest crop of mast on the beech trees for many years. Hogs are fattened with nuts. Rainfall, .03 inch.

Lafayette.—Corn is drying up rapidly. Most of it was mature enough to escape serious injury from the drought. Chinch bugs have appeared on sweet corn. No rain since August 27.

Rockville.—We are very dry now; almost equal to last year. Corn appears to be all safe. Frost on the 13th and 14th did some injury to sweet potatoes. No rain.

Spiceland.—The corn crop is exceedingly heavy and safe. No rain.

Degonia Springs.—Wheat ground is in good order again to work. Good weather to ripen corn and tobacco. Pastures are in excellent condition. Rainfall, .33 inch.

Sunman.—The week has been favorable for sowing wheat, and it has ripened the corn, so that early corn is out of danger of frost; that which was planted later is not quite safe yet. Rainfall, .28 inch.

Mount Vernon.—The fall pasture is the best we have had in several years. One fair and six clear days have affected the crop very favorably. The usual number of acres of wheat will be planted, and farmers are busily seeding. Wheat advanced to and firm at 85 cents; corn, 40 cents. No rain.

Salem.—The corn crop promises to be unusually good. The cool nights recently gave some reason to fear early frosts, in which case a part of the crop might be injured. A short time longer without heavy frost will put it out of danger. No rain.

Angola.—First frost on the 14th; quite heavy on low grounds, but it did no injury. Corn is being cut rapidly. Feeding has commenced. Rainfall, .35 inch.

Delphi.—No change from last report. As we have had no rain, the fall pasture is in worse condition. We had light frosts on the 13th and 14th, which did not injure vegetation. The corn crop in Carroll County is generally estimated at 40 bushels per acre. No rain.

H. A. HUSTON,
Director, Indiana Weather Service,
Per C. F. R. WAPPENHANS,
Sergeant, Signal Service, Assistant.

[Inclosure VI.]

KANSAS STATE WEATHER SERVICE.

Prof. J. T. LOVEWELL, director; T. B. JENNINGS, Signal Service, assistant

Bulletin for May, 1888.

TEMPERATURE.

The mean temperature for the State is below the May average, and this deficiency is most marked in the northeastern counties, where it amounts to 4° and upwards. It is less marked in the central-southern counties, being but 1.2° below the average in Sumner County, but the deficiency increases from here west, and is 2.6° in Ford County. The average temperature for the eastern division is 63°, for the middle division 63°, and for the western division 59°. Average for the State, 62°. The average maximum temperature for the State was 88°, while the average minimum temperature was 39°. The temperature conditions were uniform in the middle and eastern divisions, but ranged slightly lower in the western division, the average highest and lowest temperatures being a degree lower, and the mean being four degrees lower than in the other divisions. The frosts of the 14th and 19th did much damage to gardens and blasted many buds.

PRECIPITATION.

The average rainfall for the State was 3.24 inches; for the eastern division it was 3.50; for the middle division, 3.20; and for the western division, 3.03. Of the total amount fallen in the State the eastern division received 36 per cent., the middle division 33, and the western 31 per cent. In Wyandotte County there was an average rainfall, which extends through Jefferson, Jackson, Pottawatomie, Riley, and Washington Counties, while the counties north and east of these received an excess. The counties north of the Smoky Hill River and west of Mitchell and Jewell generally received an average rainfall, as did also the southern tier from Sumner to Cherokee. Throughout the rest of the State a deficiency exists, which is greatest in Shawnee, Wabaunsee, and Morris. During first three days of the month there was an excess of rain in the counties drained by the Republican and Solomon Rivers, an average rainfall in those drained by the Smoky Hill and Blue Rivers, and in Montgomery County, but a deficiency over the rest of the State. During the week ending May 10, there was a deficiency in the extreme western counties, and in the eastern counties south of the Kaw, including the counties drained by the Verdigris and Walnut Rivers, and an excess in Harper and Kingman, and from Russell northeastward through Marshall and Doniphan. During the week ending May 17 the deficiency noted the previous week spread over the entire State except the southern tier of counties east of Harper, there being a decided excess in Sumner and the counties east. During the succeeding week there was a good average rain over the State, except in the counties from Jewell to Butler and eastward to Douglas and Franklin. And during the last week there was a deficiency in all of the State south of the Kaw and Smoky Hill Rivers, with a decided excess in the northern counties.

HAIL-STORMS.

A severe hail-storm in Cloud County on the 11th did about $2,000 damage in Concordia, but much greater in the county. The hail not only cut down the young crops, but stripped the bark off the trees. On the afternoon of the 21st a hail-storm came into the State through Greeley and Wallace Counties, from Bent County, Colo. This storm bore nearly straight east through the State. There were three main tracks through the State, from 20 to 30 miles apart. The northern track passed through Wallace County and on eastward through Douglas. The central track, crossing the northern part of Greeley, passed eastward through that tier of counties, doing some damage to gardens in its passage. It deposited hail-stones "shoe-top deep" in the southern part of Osage County. The southern track passed across the southern part of Greeley and northern portion of Hamilton Counties. Sweeping eastward, it greatly damaged all crops in the northern part of Harvey County, and did considerable damage in the northern portions of Butler and Greenwood, southern parts of Coffey, Anderson, and Linn, and some damage in Woodson, Allen, and Bourbon. A severe hail-storm the week previous (on the 17th) passed from Pratt southeast through Cowley, Chautauqua, and Montgomery. On the evening of the 25th another hail-storm crossed the west line into Wallace County, and bearing a little north of east did very much damage in Clay, Riley, and other eastern counties on the 26th. During the same day a severe hail and wind storm cut across Decatur and Norton Counties, and sweeping down the Solomon valley, causing much damage in its course, it joined the one from the west in Clay County. A third track passed through Washington and Marshall Counties on the same afternoon (26th).

CHINCH BUGS.

The cool weather of the past three weeks seems to have prevented the second brood from hatching, as reports from all sections save Woodson County state that the pest is "fast disappearing from some cause."

The remarks by the observers herewith are interesting as showing the advance of the season.

The rainfall tables are continued this month, and some temperature tables added.

CARNEIRO.

On the 3d we had the unprecedented rainfall, for this locality, of 1.1 inches in half an hour, falling between 6.30 a. m. and 7 a. m. A light frost occurred on the 14th, but did no material damage. On the 17th we had a fine, misty rain all day, the best kind of a rain for vegetation.

CAWKER CITY.

On the 2d, appearance of a heavy thunder-storm in the east. On the 26th, at 2 a. m., a heavy hail-storm lasting about 15 minutes, and accompanying an electrical storm. At 8 p. m., same day, an electrical storm and hurricane from the west did considerable damage all through this country.

GIBSON.

Evenings and mornings very cold for time of year. Numerous showers have fallen this month, and coming gently very little escaped into the creeks. On the 9th a heavy fog; 18th, a slight frost. On the 23d and 26th hail fell the size of small bird's eggs; very little damage done in this section.

INDEPENDENCE.

The notable features of the weather were the frequent changes or cool waves which followed all rain or thunder storms, rather than the average low temperature, which was unfavorble for corn, cotton, etc. The month closes with all crops in good condition and favorable weather, with no insects interfering, but the web-worm moth (*Eurycreon rantalis*), that was so injurious to corn and gardens in 1885, has appeared in large numbers; the larvæ or caterpillars have not made their appearance at the close of the month. The wind-storms on the 17th and 25th damaged orchards by blowing down some trees; also barns, out-buildings, etc., were damaged in some localities. As a whole, the month was favorable to crop growth. Corn is late and small, but has a good color, and is growing rapidly at close of the month.

Temperature.—The mean temperature of 64.6° is 1.9° below the May average for past seventeen years. The highest mean for May was 72°, in 1880; the lowest was 60.8°, in

1872. The mean temperature for this spring is 54.4°, and is 1.8° below the spring average for the past seventeen years. The highest spring average was 61.8°, in 1879; the lowest was 53.2°, in 1874.

Rainfall.—The rainfall of 4.82 inches is .59 inch above the average for sixteen years. The largest May rainfall was 10.06 inches, in 1878; while the smallest was .88 inch, in 1874. The amount for spring is 13.28 inches, which is 3.37 inches above the spring average. The greatest spring rainfall was 16.69 inches, in 1878; the least was 6.53, in 1879.

We had a very light frost on the 14th—merely traces of frost on bottoms. The hail on the 3d was the size of hazel nuts, while that on the 15th was 1½ inches in diameter. Lunar halo on the 21st and 25th, having the colors of the rainbow.

JACKSONIA.

Dews frequent; fog on the 2d and 6th; rainbows on the 5th, 8th, 20th, 21st, 25th; zodiacal light on the 3d, 4th, 8th, 9th, 10th, 11th, 13th, 29th; mirage on the 20th, 29th, 30th; parhelia on the 10th. Butcher birds appeared on the 1st, barn swallows on the 9th, viper on the 10th, sand lizard on the 11th, house martin on the 22d, chinch bugs on on the 31st.

ROME.

Distant lightning on the 1st, 2d, 5th, 6th, 9th, 10th, 13th, 15th. Appearance of thunder-storms elsewhere—9th in the east, 26th in the west and northwest. On the 17th heavy thunder-storm at this station, when 1.51 inches of rain fell in two hours. On the 22d a bright rainbow at sunrise. On the 23d a heavy rain with some hail. Wheat headed out. Oats partly headed. Grass good. Corn good, but not as large as it has been at this date the past two years. We have had an abundance of rain this month. In May, 1887, we had 2.91 inches. The ponds are now full and the ground is thoroughly soaked.

TORONTO.

Thunder-storm formed overhead on the 2d and passed to the northeast. On the 7th a thunder-storm passed south of the station, going east. On the 9th another one passed south, going east. On the 17th one passed over the station going east, and on the 23d another passed over us, going eastward, from which we received the heaviest rainfall of the month. Hail at Yates Center on the 9th and 22d. Light frost on the 4th and 14th, slightly damaging the corn and potatoes. The mean temperature of 61.9° is 2.6° below the average May temperature for the past eight years. The highest mean occurred in 1880, when it was 70°; the lowest mean, 56.8°, occurred in 1882. The rainfall of 1.34 inches is 3.42 inches below the May average for eight years. The largest May rainfall was 9.00 inches, in 1881; while that for the present year is the smallest on our record. The month has been far too dry for crops, but very favorable for insect pests.

WAKEFIELD.

A destructive hail-storm passed over this place on the morning of the 26th, striking here about 4.25 a. m., breaking 34 lights of glass on the north and west sides of my house (about 4 miles southwest from Wakefield), destroying in its track all small fruits, cereals, and gardens.

WATERVILLE.

Severe wind on the 26th from west of north, blowing over windmills and outhouses; lasted fifteen to twenty minutes. Heavy rain north, raising the Little Blue River 6 feet in four hours.

WELLINGTON.

The mean temperature was 63.6°, which is 1.2° below the May average for the past ten years. The warmest May on our record was in 1880, with a mean temperature of 71.1°, while the coldest was 58.2° in 1882. The maximum for the month was 88°, on the 15th. There have been six higher temperatures in previous years, and of the minimum (40° on the 4th) there have been six lower temperatures in previous years. Though the temperature has several times nearly reached the frost limit, yet no frosts have been observed. The total precipitation for the month was 4.66 inches, which is .23 inch below the May average for the past ten years. The largest May rainfall was

9.37 inches, in 1881; the least, .88 inch, in 1886. Locust trees and snowballs were in bloom on the 2d; strawberries ripe on the 10th; wheat in bloom on the 16th; cherries ripening on the 24th; potatoes ready for market by the 24th; during the last ten days prairie and tame grasses sufficiently high to mow for hay. At close of month wheat, oats, and corn are eight days in advance of the usual time. The record of former Mays shows several instances where wheat harvest commenced on the 25th, but the wheat this month has an unusually heavy growth of stalk and head, in view of which fact the abundance of moisture in the soil has a tendency to delay wheat harvest from five to ten days later than usual.

Rainfall, in inches, as observed at Leavenworth, Kans.

[Signal Service observations.]

Years.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Mean	.....	.....	.....	.....	.....	4.75	5.20	4.70	1.18	.....	3.94	.73
1872	.13	.87	1.95	3.63	7.91	3.15	9.99	6.66	4.22	2.06	.06	1.34
1873	3.02	1.03	1.75	5.07	5.38	4.96	2.04	2.40	3.64	1.56	.89	5.24
1874	3.14	1.35	3.05	2.80	1.60	3.85	3.23	1.74	5.50	1.49	3.46	1.35
1875	.23	1.25	2.50	1.67	3.53	5.71	8.82	3.78	1.97	.72	.39	2.60
1876	1.42	.20	5.78	7.65	6.78	10.00	4.01	3.40	3.56	2.79	2.87	.31
1877	.73	.50	4.39	7.14	8.67	5.27	5.34	2.85	1.95	4.87	2.44	3.18
1878	2.34	2.94	2.35	2.86	5.28	9.90	3.08	3.31	2.64	1.16	1.76	2.16
1879	1.16	.54	.32	3.57	3.04	1.69	4.99	.18	3.41	4.25	7.85	2.34
1880	2.00	1.40	2.22	1.38	5.01	5.27	6.86	7.06	2.78	3.69	2.40	.40
1881	.44	4.84	2.17	1.86	3.65	5.27	1.72	2.74	6.89	5.73	3.42	1.18
1882	.83	1.17	1.15	4.15	2.53	5.06	3.44	.83	.55	2.86	1.87	1.13
1883	.75	2.92	1.05	.97	7.33	10.84	3.58	1.95	1.57	8.31	2.02	.65
1884	.97	1.42	3.70	4.74	4.79	3.83	9.43	4.65	5.38	3.41	1.42	1.48
1885	1.47	.87	.31	6.63	5.89	4.00	4.56	5.20	7.65	4.23	1.86	.97
1886	1.60	.61	1.35	1.47	4.71	4.93	.55	.73	2.75	1.08	1.10	.65
1887	1.27	1.94	1.59	1.99	3.07	5.43	1.36	7.11	5.73	3.87	1.14	2.55
1888	.93	1.24	4.55	5.65	7.07	.....	.....	.....	.....	.....	.....	.....

Rainfall, in inches, as observed at State Agricultural College, Manhattan, Kans.

Years.	Jan.	Feb.	Mar.	Apr.	May	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1858	2.50	.46	.....	4.44	5.12	4.83	6.34	3.98	1.10	4.67	.69	1.11
1859	1.50	.61	2.88	2.54	9.42	3.57	4.99	6.84	1.82	*.60	1.20	.20
1860	.60	1.84	.....	.12	1.13	2.69	2.09	2.85	†1.32	.42	1.58	.50
1861	1.35	.....	.....	2.00	3.76	8.23	6.08	1.29	8.06	2.02	.70	1.00
1862	1.50	.12	.....	3.63	6.18	1.37	3.83	2.85	4.15	1.62	1.70	2.25
1863	.06	2.30	.....	9.12	3.13	5.95	4.53	6.21	.73	2.40	2.23	2.17
1864	.44	.....	2.12	1.68	2.29	2.06	3.02	1.84	2.30	.68	1.61	1.11
1865	.33	2.21	2.27	2.03	2.04	7.98	6.42	5.04	.....	.....	.....	.....
1866	.....	.....	.....	.....	2.83	3.60	3.27	.10	6.23	.43	1.37	2.02
1867	.65	2.01	.63	2.44	3.59	5.65	5.42	.70	3.50	.91	.49	.51
1868	.30	.18	.93	1.96	1.38	3.48	4.70	5.94	5.72	2.51	2.17	.81
1869	1.15	1.17	1.06	2.20	1.12	8.85	6.27	2.43	1.83	.43	1.19	.52
1870	.05	.....	1.45	.50	.91	.79	2.98	5.21	4.57	5.06	.13	.45
1871	.53	2.48	1.02	3.00	5.07	2.05	5.03	4.25	1.92	1.20	1.96	.35
1872	.13	.48	.92	2.06	6.81	1.73	8.92	5.32	5.70	2.76	.....	.95
1873	.84	.30	.74	1.67	8.54	4.68	2.84	1.63	1.85	4.20	.82	1.67
1874	.50	1.57	.30	1.40	2.98	4.31	.18	.25	4.53	.22	2.12	.67
1875	.22	.87	1.11	1.60	2.46	2.06	3.23	1.40	2.85	1.04	.34	.78
1876	.....	.05	3.96	7.52	5.78	4.60	5.65	10.70	3.11	1.61	1.75	.50
1877	.46	.94	2.70	.....	7.90	6.76	4.16	2.78	1.52	9.07	1.90	1.55
1878	2.35	1.44	1.77	2.02	4.04	5.02	12.71	2.66	3.22	1.06	1.90	.91
1879	.....	.....	.....	3.21	1.79	8.48	4.91	1.61	4.30	2.63	7.83	.62
1880	.56	.05	.50	1.08	3.74	3.92	3.78	8.51	2.52	2.20	1.97	.28
1881	.50	2.75	.75	1.56	6.67	3.88	1.32	.43	4.92	4.20	1.86	.53
1882	.42	.42	.80	3.47	5.43	3.08	7.73	.87	1.20	3.54	.95	.44
1883	.25	1.75	1.05	2.36	4.83	9.58	4.15	3.94	1.26	7.05	.30	.27
1884	.30	.58	2.36	3.23	4.63	3.82	5.54	6.21	3.33	2.22	1.07	.33
1885	1.08	.55	.....	4.03	4.30	1.67	4.99	.89	4.28	1.72	.19	1.09
1886	1.31	.35	1.55	4.76	3.87	5.43	2.84	2.06	1.14	2.42	1.24	1.58
1887	.68	1.15	.42	2.85	2.54	4.50	.90	6.66	6.88	2.20	.29	.....
1888	.65	2.67	2.48	.....	.....	.....	.....	.....	.....	.....	.....	.....

* First 25 days of month. † Last 19 days of month.

Rainfall, in inches, as observed at Independence, Kans.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total for year.
1873	2.44	1.39	2.46	3.07	3.28	2.63	6.67	2.57	4.81	.86	1.24	4.10	37.42
1874	2.01	2.28	2.58	3.61	.88	9.15	.39	.39	2.87	.75	2.80	.94	27.65
1875	.30	.62	2.87	5.60	4.07	3.40	10.22	2.79	2.75	1.25	.74	3.91	48.32
1876	2.14	.30	4.54	2.52	4.37	7.43	3.47	.77	1.46	2.58	3.90	1.25	34.73
1877	1.15	1.40	1.85	4.36	5.96	9.00	6.71	3.25	2.17	5.57	2.07	3.10	46.56
1878	2.69	3.98	3.13	3.50	10.06	8.13	2.93	.70	1.95	1.53	1.32	3.26	43.20
1879	2.03	1.30	.85	4.76	.92	3.54	3.26	4.12	1.34	2.49	3.30	5.17	33.08
1880	1.54	.47	1.46	2.02	3.92	3.83	3.15	4.59	.72	1.48	2.57	.79	26.56
1881	1.15	7.04	2.72	2.70	6.61	11.26	2.46	.85	9.11	6.34	2.89	1.91	55.04
1882	1.53	3.99	1.56	2.08	6.21	4.92	2.04	2.66	1.63	4.48	2.16	.73	34.00
1883	.93	3.68	1.38	1.64	5.00	4.10	4.83	2.83	.27	7.16	.79	1.66	34.27
1884	.68	2.23	1.00	4.85	1.27	2.52	5.77	5.83	9.71	4.22	2.58	3.34	44.00
1885	2.12	1.22	1.31	5.12	5.62	5.27	5.02	7.46	7.94	1.79	.58	.95	44.30
1886	1.58	1.48	1.68	4.98	1.11	2.23	3.60	4.25	5.27	1.02	1.70	.65	29.55
1887	.79	1.55	2.18	3.23	3.61	4.25	3.21	3.60	3.82	2.61	1.00	1.86	31.71
1888	1.28	2.23	2.09	6.37	4.82	.....	.....	.....	.....	.....	.....	.....	.....
Average	1.52	2.18	2.08	3.68	4.23	5.75	4.14	3.11	3.72	2.94	1.99	2.24	.....

STATE SUMMARY.

Temperature.—Monthly mean, 62°; highest monthly mean, 68°, at Grenola; lowest monthly mean, 56°, at Eureka; maximum, 94°, at Dorrance, Ninnescah, McAllaster, and Montero, on the 2d, 20th, and 21st; minimum, 30°, at Topeka and Jacksonia, on the 18th and 19th; range for State, 64°; greatest local monthly range, 59°, at Jacksonia; least local monthly range, 41°, at Cawker City; greatest daily range, 55°, at McAllister, on the 1st; least daily range, 1°, on the 23d, at Waterville.

Precipitation, including melted snow (in inches).—Average for the State, 3.24; greatest, 7.70, at Leavenworth; least, .87, at Topeka.

Wind.—Prevailing direction, south.

Thunder-storms every day, except on the 1st, 4th, 12th, 13th, 19th, 27th, 29th, and 31st.

Hail on the 2d, 3d, 9th, 11th, 15th, 17th, 20th, 21st, 22d, 23d, 25th, 26th, 27th, and 28th.

Frost on the 4th, 12th, 13th, 14th, 16th, 18th, and 19th.

Miscellaneous.—Solar halos on the 1st, 16th, 23d, 26th, and 27th; lunar halos on the 21st and 26th; mirages on the 20th, 29th, and 30th; parhelia on the 10th.

Monthly summary of meteorological reports by voluntary observers of Kansas weather service, May, 1888.

Stations.	Counties.	Altitude above sea level, in feet.	Barometer. Highest. Inches.	Barometer. Highest. Date.	Barometer. Lowest. Inches.	Barometer. Lowest. Date.	Barometer. Mean.	Temperature. Highest. Degrees.	Temperature. Highest. Date.	Temperature. Lowest. Degrees.	Temperature. Lowest. Date.	Temperature. Mean (deg.).	Temperature. Mean of maximum (deg.).	Temperature. Mean of minimum (deg.).	Precipitation. Total.	Precipitation. Greatest in 24 hours. Amount.	Precipitation. Greatest in 24 hours. Date.	No. of days— Rainy—.01 inch or more.	No. of days— Cloudy.	No. of days— Fair.	No. of days— Clear.	Prevailing wind at— 7 a. m.	Prevailing wind at— 2 p. m.	Prevailing wind at— 9 p. m.	Prevailing wind at— Month.	Dates of— Thunder storms.	Dates of— Hail-storms.	Observer.
EASTERN DIVISION.																												
Belleville	Republic																											A. B. Graves.
Brookville	Saline	1,365						93	2, 21, 25	40	14	62	79	53	2.40	1.10	5	5	8	12	11							John Hogan.
Concordia	Cloud	1,384	30.25	14	29.87	2	29.87	89	2	37	14	59	71	48	3.98	.94	11	10	13	12	6	SE.	N., S.	SE.	SE.	2, 3, 10, 15, 26	11	E. M. Ravenscraft.
El Dorado	Butler																											Prof. H. C. Ford.
Eureka	Greenwood	1,150					28.80					56		48	3.36													Prof. A. T. Burnell
Grenola	Elk							90	21, 25	48	4	68	82	60	2.30	1.25	17	3										R. M. Lawyer.
Halstead	Harvey	1,410																										D. C. Ruth.
Independence	Montgomery							86	15	41	4	65	77	54	4.82	2.37	17, 18	10	4	16	11	S.	S.	SE., S	S.	2, 15, 17, 23	3, 15	J. M. Altaffer.
Lawrence	Douglas	880	29.20	14	28.62	2	28.96	83	22	38	19	62			1.97			8	8	10	13				SE.		15, 22	Prof. F. H. Snow.
Leavenworth	Leavenworth	842	29.34	14	28.67	2	29.00	83	26	36	1	60			7.70	2.40	7	14	8	14	9				N.			L. A. Welsh.
Lebo	Coffey	1,165						89	10, 30	38	19	62	76	50	2.42	.97	22, 23	10	7	18	6	S.	S.	S.	S.	7, 11, 15, 17, 18, 22, 30	22	C. W. Burnet.
Morse	Johnson														2.75													R. P. Edgington.
Rome	Sumner							90	15	41	14	63	75	55	4.04	1.51	17	4	4	17	10	N. & S	S.	S.	S.	6, 7, 17, 23	17, 23	D. M. Adams.
Sedan	Chatauqua							91	15	51	8, 18	66	78	60	4.68	1.96	16, 17	8	6	12	13	SE.	SE.	S.	SE.	2, 6, 9, 15, 16, 17, 22, 23, 26	15, 17	J. W. Goodell.
Topeka	Shawnee	1,000						87	20	30	19	61	74	46	.87	.26	6, 7	10	8	16	7					3, 6, 7, 10, 11, 15, 26, 30		A. H. Denny.
Toronto	Woodson							85	15	35	14	62	74	50	1.34	.81	23, 24	9	5	16	10	S.	S.	SE.	S.	2, 7, 9, 17, 23	9, 22	F. R. Gray.
Wakefield	Clay							90	30	32	14	63	74	57	4.27	1.53	7	13	5	8	18	SE SSW.	S. SW.	S.	S.	3, 4, 5, 6, 7, 10, 11, 15, 16, 17, 25, 26, 28	26	Wm. P. Cochran.
Waterville	Marshall							86	2	48	8	66	74	59	6.63	2.49	7	10	5	14	12	N.	N.	N.	N.	3, 5, 7, 10, 26, 28	3, 15, 26, 28	H. Hamfreville.
Ottawa	Franklin	926					28.92	85	27	34	19	62	76	48	1.31	.42		11	5	14	12					7, 9, 10, 15, 22, 23, 23, 26		Prof. O. C. Charlton
Wellington	Sumner							88	15	40	4	64			4.66	1.95	17	7	3	14	14						17	John H. Wolfe.
Average								88		39		63	76	53	3.50			9	6	14	11	S.	S.	S.	S.			

MIDDLE DIVISION.																												
Bunker Hill	Russell*	1,882						90	26			64			4.25	2.00	5	5	12	7	12							G. I. Knapp.
Carneiro	Ellsworth	1,672						90	2	39	14	62	74	54	2.77	1.10	3	5										H. W. Boyle.
Cawker City	Mitchell							84	21	43	17	59	69	55	3.30	1.10	26	9	6	17	8	N.	N.	N.	N.	11, 15, 21, 24, 26	3, 26	A. G. Alrich.
Dorrance	Russell							94	2	44	6	65			3. +	2.00	5, 6	7	5	12	14				N.E.			F. G. Nichols.
Ellis	Ellis	2,135						90	19	39	1	64																
Ellsworth	Ellsworth	1,556						90	30	40	16	64			2.35	1.30	5	5									3	A. D. Maggart.
Gorham	Russell							87	2	40	19														S.			
Hays City	Ellis	2,009						92	2	37	24																	Thos. Gallagher.
Kanopolis	Ellsworth	1,600						87	28	40	7, 17	63			3.35	1.00	21											
Ninnescah	Kingman							94	2	39	14	62	75	56	2.02	.93	5, 6	8	4	20	7	S., NW.	S.	S.	S.	5, 17, 22, 23, 26, 30.	17	E. Shaw.
Ogallah	Trego							87	29			65						4										Norah Yetter.
Russell	Russell	1,850						80	30	36	17				5.00	3.00	5	6	13	10	8							W. J. Hillyer.
Salina	Saline																											
Victoria	Ellis	1,946						85	21, 24			65	74		3.87	2.00	5	7	8	9	14							W. J. Holt.
Wakeeney	Trego	2,474						88	20	38	1, 5							7	8	9	14							J. S. Morton.
Walker	Ellis							87	29	40	4, 18																	W. T. Radford.
Wilson	Ellsworth	1,712	30.01	14	29.16	2	29.64	90	2	33	4	61	75	47	2.39	1.16	5, 6	11	7	16	8	W.	S.	NW.	NW.	3, 6, 10, 11, 14, 15, 17, 21, 23, 26, 28		E. Y. Dolenmayer.
Wilson	Ellsworth							88	2, 21	40	4				2.69													P. S. Cross.
Average								88		39		63	73	53	3.20			7	8	12	11		S.		S.			
WESTERN DIVISION.																												
Allison	Decatur																											John J. Cass.
Buffalo Park	Gove	2,773						85	2	40	3, 18	59	72	50				6	9	12	10				S.			E. M. Smith.
Colby	Thomas																											
Collyer	Trego	2,608						84	2	42	18	60	70	51		.42	3, 26		9	8	14				N.			D. M. Brown.
Dodge	Ford	2,523	30.24	14	29.40	2	29.89	84	2	39	4, 18	60	74	49	2.86	1.26	5	9	4	16	11	N.	SE., SSW.	NE., SE.	SE.	5, 7, 17, 21, 23		J. E. Lanouette.
Eustis	Sherman	3,552																										
Gibson	Trego	2,550						90	1	38	14	58	73	48	2.98	.75	23	8	9	8	14	S.	NW.	N., SE.	S.		23, 26	Charles M. Bell.
Grainfield	Gove	2,829						82	22	38	2, 18	60	69	48	4.40	3.00	6	6	7	16	8				N.			E. A. Lewis.
Grinnell	Gove	2,912						90	21	32	7								7	9	15				S.			E. R. Bradshaw.
Jacksonia	Greeley						*26.02	89	20	30	18	58	75	45	1.22	0.84	20, 21	7	7	13	11	N. & S.	N.	S.	S.	2, 3, 8, 16, 20, 21, 25.	20, 21	S. B. Jackson.
McAllaster	Logan							94	20, 21	36	1	60	77	51	2.40	.70	20, 21	10									2 2, 20-1, 25	W. H. Parker.
Montero	Wallace							94	20				75	52					9	12	10				SE.			W. F. Howe.
Monument	Logan							86	20	40	5, 17																	
Oakley	Logan							87	20, 21	40	7																	C. M. Kaufman.
Pence	Scott																											P. W. Bast.
Quinter	Gove							86	21	42	16	60			4.30	1.30	25	7	8	12	11				SW.			H. W. Hart.
Winona	Logan							88	20	38	6																	J. S. Adams.
Average								88		38		59	73	49	3.03			8	8	12	11	N., S.		SE.	S.			

* Mean of last 9 days.

KANSAS WEATHER SERVICE.

Weather crop bulletin, No. 18, for week ending June 28.

[From reports by our voluntary observer.]

TOPEKA, *June* 30, 1888.

Rainfall.—The rainfall averaged 1.3 inches over the State the past week, which is slightly above the June normal. Dividing the State by the third standard parallel into two slightly unequal portions, we find the northern portion received an average of 1.57 inches, or 62 per cent. of the whole amount, and the southern an average of 1.01 inches, or 38 per cent. of the whole amount. The counties south of the Arkansas River, south of Greenwood, east of the Neosho River, and east of Russell, Rooks, and Phillips received an excess, while in the other counties, including Saline, a deficiency occurs, which is greatest from Saline to Greenwood, and in the northwestern counties.

Temperature and sunshine.—The temperature has generally been below the average in the middle and eastern counties, with but a small per cent. of sunshine, while in the western counties these conditions have been normal.

Results.—As to the condition of corn at close of the week, there is but one voice, "never was better at this time of year;" it is in silk in the south. Wheat harvest has about ended in the southern, still in progress in the middle, and has commenced in the northern counties. Oat harvest has commenced in the southern and middle counties. Rye and hay harvests are in progress in the western, and flax is ready for harvest in the southern counties. Millet gives fine promise. Thrashing is now in progress in the southern, and to a small extent in the middle counties. New wheat and oats are now appearing on the market. In Pratt and Kingman the recent rains failed to revive the early potatoes, while in Coffey the damp weather is rotting the potatoes in the ground. Chinch bugs are at work in Osborne, but have diminished in the south and east. Web worms are at work on the weeds in Coffey, Chase, and Lyon, and are disappearing in the south.

J. T. LOVEWELL,
Director.
T. B. JENNINGS,
Sergeant, Signal Corps, Assistant.

[Inclosure VII.]

LOUISIANA STATE WEATHER SERVICE.

NEW ORLEANS, LA., *July* 1, 1888.

SIR: I have the honor to make the following report of the work of the Louisiana weather service during the period ending June 30, 1888:

As soon as practicable after my arrival in this city on October 18, 1887, I called upon the members of the various commercial bodies to secure an appropriation from them for the purchase of meteorological instruments for the observers of this service, with the following result: Cotton Exchange appropriated $100; Sugar Exchange, $100; Produce Exchange, $100, and Sugar Planters' Association, $125.

This money, with the exception of $50 still owing by the Sugar Exchange, has been expended in the purchase of instruments, and to pay for printing of monthly reports, etc.

On December 1, 1887, barely six weeks after my arrival, thirty observers had been secured to make observations, and thirty-nine display stations had been established for the dissemination of cold-wave and frost warnings. At the present time there are 40 observers making reports to this office, and 44 display stations in operation.

Owing to the limited telegraphic facilities of the State the dissemination of the daily weather indications to many places is impracticable, and there are but ten stations in the State receiving them direct by telegraph. There are, however, a number of places that receive this information by mail from the nearest point at which displays are made daily, and the service, from all that can be learned, gives great satisfaction.

The display of cold-wave flags for cold-wave and frost warnings is the particularly interesting feature of the work of the service to the people of the State, sugar planters deeming them an absolute necessity. In the cotton-growing region of the State these reports, although of less intrinsic value to the people, are yet deemed of great importance; sufficiently so to make the public ask to have them mailed from the nearest telegraph station so that they, too, may derive benefit from the dissemination of Signal Service warnings by the State weather service.

From a meteorological standpoint, this service has been of inestimable benefit to the immigration societies and the press of the State in collecting data to establish the climatology of the various sections. Many planters had personal records, kept for their own information, and copies of these records were secured and compilations made from them in conjunction with the reports from regular Signal Service stations, and from voluntary observers, so that there are but few sections in Louisiana from which reliable statistics regarding the rain-fall, temperature, and frost, etc., are not on hand.

The weekly weather-crop bulletins have been issued regularly since March 3, 1888, and won immediate favor with the press of the entire State. They are published regularly in all the papers, and posted conspicuously with the bulletin of the Signal Service in the various exchanges and public places throughout the city.

The daily morning maps of the Signal Service are posted in eleven of the principal towns of southern Louisiana by the observers of the Louisiana weather service stationed at those places, the citizens of such places considering themselves highly favored by having the information from which regular predictions are made at hand, so that they too may look and learn.

On the whole the advantages of the service to the people of the State have been such as to win golden expression from the entire press and words of approbation from the business and commercial interests.

A bill for the support, equipment, and expenses of the services has been presented to the State legislature, now in session, and has been favorably reported by the agricultural committee having it in charge. The only obstacle to its passage, giving the appropriation asked for ($6,900) is that the revenues of the State are not sufficient to meet the appropriations already made by the legislature. The State representatives have expressed themselves as being in favor of a State weather bureau to be supported by the State, and express regret that the finances of the State are such as to prohibit the passage of the bill as originally drawn.

Very respectfully, your obedient servant,

R. E. KERKAM,
Sergeant, Signal Corps, Director.

Lieut. H. H. C. DUNWOODY,
Acting Signal Officer and Assistant, Washington, D. C.

Weekly weather crop bulletin of the Louisiana weather service.

NEW ORLEANS, *Saturday, July* 14, 1888.

An improvement is noted in the growing crops throughout the State, except in the northwestern section, where local rains were an almost daily occurrence, with a consequent lack of sunshine.

The average temperature for the week has been slightly above the normal at the majority of stations reporting, which, combined with the generous amount of sunshine, has had a favorable effect on the growth of the crops.

In but few sections is the rainfall for the week reported heavy. The rains were of a local nature, and, as a rule, were preceded and succeeded by warm, sunshiny weather. The totals for the week are as follows: Minden, .84; Shreveport, .88; Keatchie, .80; Liberty Hill, .57; Monroe, .01; Girard, .42; Point Pleasant, .10; Coushatta, .77; Natchitoches, 1.95; Trinity, .40; Alexandria, .57; Marksville, .74; Cheneyville, 1.10; Clinton, 1.50; Amite, 1.96; Baton Rouge, 1.51; Grand Coteau, .56; La Fayette, 1.89; Sugar Experimental Station, 2.38; New Orleans, .61; Abbeville, .44; Jeanerette, 1.00; Des Lignes, .46; Thibodeaux, 0.91.

OBSERVERS' REMARKS.

Shreveport.—Crops very grassy, and need work and sunshine; upland corn is fine.

Liberty Hill.—Cotton looks well; grass in the way yet.

Keatchie.—Everything favorable; no complaints heard.

Point Pleasant.—Warm nights and heavy dew have been favorable.

Coushatta.—Lands too wet to plow cotton; very grassy; corn crop not as good as it was thought to be; too wet to fill out.

Trinity.—The past week has been very favorable; all crops look well; worms reported, but doing no damage; ten days of sunshine will clear all farms of grass.

Alexandria.—Planters making good headway cleaning grass out of crops, some have thrown out few acres on account of inability to get labor to clear it all of grass; no rain needed for days.

Marksville.—Crops generally are good; promise for corn 50 per cent. better than last year, and cotton three weeks later.

Clinton.—Some complaint of too much rain for cotton; corn crop now made, and a good one; altogether present prospects excellent.

Baton Rouge Experimental Station.—Corn doing finely; conditions favorable as regards the effect of the weather on all crops.

Grand Coteau.—Too many local rains; grass taking the upper hand.

Sugar Experimental Station.—Crops looking fine, although the daily rainfall is a little too much for them.

Jeanerette.—Reports generally very favorable in this section.

Abbeville.—The wet spell is apparently drawing to a close; all crops have been injured by excessive rains of past month; worms eating cotton in some localities.

Des Lignes.—Past week was quite favorable to all crops; cane growing rapidly; rice very fine; field-work being pushed to completion; crops look well, and prospects are brighter.

Thibodeaux.—Corn is being cleared of grass; much has been already laid by; late corn badly damaged by excessive rains; rice doing nicely.

R. E. KERKAM,
Sergeant Signal Corps, Director.

[Inclosure VIII.]

MICHIGAN WEATHER SERVICE.

[Co-operating with the Signal Service, U. S. Army.]

OFFICE OF THE DIRECTOR,
Lansing, Mich., July 1, 1888.

SIR: I have the honor to submit the following report of work of the Michigan weather service for the year ending June 30, 1888.

There has been no change in the working force of the office during the year.

The service has been extending the stations where observations are taken regularly, so that now there are but few counties that are not furnished with reliable instruments for taking the daily observations of the weather.

Some few stations have been discontinued, as the reports were not furnished regularly, or the observer had to relinquish the work on account of press of his regular duties, in which case the instruments were transferred to some one in the immediate vicinity, so that there have been but few breaks in the reports.

The service publishes monthly an average of eighty-two reports, seventy-six of them being reports from voluntary observers and six from the observers of the United States Signal Service.

I believe that the service should be congratulated upon the very efficient corps of observers who have contributed so willingly their time and money to bring the service up to its present standard.

I believe for many good reasons that the voluntary observers should receive some compensation for their labors, not only as an incentive to continued work but more especially as a slight return for their outlay in time and money. There are many good observers in this State who would furnish excellent reports if they were paid a slight compensation for them, and it would give better results to all as a whole if this were done. As to the observers of this service, I can not commend them too highly for their assistance during the past year.

WEATHER SIGNALS.

At the close of the year there were one hundred and forty stations in the State displaying weather signals upon receipt of the indications issued by the Chief Signal Officer at Washington, through this office. The number of stations have been added to and subtracted from during the year. The majority of the stations were discontinued because the displaymen would not furnish the required monthly report. Several instances have come to the notice of the director where the signals were regularly displayed, yet it was impossible to have them forward their monthly report with any regularity. The displaymen are willing to take care of the flags daily, but are not willing to make out this report and mail it to this office. For this reason the director has not discontinued the indications where it was believed that the general public was receiving substantial benefit from the display of the signals. Another difficulty that has been encountered is

the purchase of the signal flags by individuals. When the first set is worn out some trouble is experienced in raising the necessary funds to purchase a new set of flags, and in many cases the station is discontinued because the burden falls on one or two persons.

The indications are furnished free, by telegraph or telephone, to any locality where the signal flags are purchased.

The United States Signal Service furnishes the indications free to twenty-five stations by telegraph and twenty-one by telephone. This service furnishes the indications to seventy-six stations by telephone. The remaining stations are furnished with indications over the wires of the Chicago and Grand Trunk Railway, Detroit, Grand Haven and Milwaukee Railway, and the Grand Rapids and Indiana Railway. These railroads furnish the indications free to the stations along their lines. The Detroit, Lansing and Northern Railway send the indications at 8 a. m. daily, except Sunday, to twenty-one stations on its line of road. These indications are posted at the station, on bulletin-boards furnished by the Chief Signal Officer, and meet the requirements of a class of travelers that could not otherwise be reached.

RAILWAY WEATHER SIGNALS.

The weather signals are now displayed on the baggage cars of twenty-six trains of eight of the principal railroads of the State. These weather signals have met with the popular demand of the agricultural interests of the State and have been very successful, the farmers generally placing great confidence in the indications of the weather as indicated by these signals. I believe that this mode of displaying the weather indications is more satisfactory and reaches a larger number of interested people than the display in the cities and towns.

The following railway companies are co-operating with the service in displaying these weather signals: Chicago and Grand Trunk Railway; Detroit, Grand Haven and Milwaukee Railway; Detroit Division, Grand Trunk Railway; Michigan Central Railway, and branches; Grand Rapids and Indiana Railway; Chicago and West Michigan Railway; Port Huron and Northwestern Railway; and Pontiac, Oxford, and Port Austin Railway.

To the officers of these roads the director wishes to extend the thanks not only of the service, but also of the patrons along their lines, for the hearty co-operation and aid which they have rendered.

STREET-CAR WEATHER SIGNALS.

By the co-operation of Superintendent Clark, of the Lansing Street Railway Company, with this service, two sets of signals are carried on the street-cars of Lansing. The signals are seen by a large number of citizens who would otherwise not receive the benefits to be derived from the daily weather forecasts. It is the intention of the director to extend this system to other towns as rapidly as possible. The average percentage of verification of weather indications for the past year for the State has been 83.0.

During the past year the director has been engaged in compiling the daily and monthly temperature and precipitation normals from the records of the past twelve years. The work was begun in November, 1887, and at the present time the normals are completed up to and including the month of August. These normals have been of great service to the State during this season for comparison, to estimate the condition of the various cereals grown in this State. When this data is finished, which will probably be in about two months, this service will then have some valuable comparative information which will be within the reach of all classes, and they are now used to a considerable extent by the farmers.

These normals have been computed for the entire State and for the upper peninsula, northern, central, and southern sections of the State, so that the peculiarities of each section may be easily ascertained.

The weather crop bulletin was issued regularly each Saturday until October 1, 1887, when it was discontinued during the winter season, and resumed again on March 4, 1888, and has been continued to date.

There are 75 copies of this report issued every Saturday morning, and mailed to the different newspapers and to correspondents, and also given to the newspaper correspondents in this city to be sent to their papers. This report gives in a brief and concise way the effect of the weather on the different growing crops during the past seven days, and does not encroach upon the field now occupied by the secretary of state in his monthly report. The service is indebted to Mr. Robert L. Hewitt for his valuable assistance in preparing this report. The agricultural interests have made good use of this bulletin this season, and I believe the bulletin is fully appreciated by the farmers who have had access to it.

The average issue of monthly reports is 3,800 copies, or a total of 45,600 for the year. These reports are printed and bound with the monthly crop report, and mailed by the secretary of state to all citizens of the State who may apply for them. The reports of this service are printed and distributed by the secretary of state, as required by law. This office mails 300 copies of the crop report to the voluntary observers, displaymen, and State weather service exchange list.

There are seven barometers, two sets of thermometers, and one rain-gauge that have not yet been issued to observers. These instruments will be issued in the course of a month, as there is a sufficient number of applications to take them all.

I believe, from information that this office has received, that the weather service of Michigan has already been of sufficient value to more than reimburse the State for the liberal appropriation which enabled it to take the position it now occupies, and to continue the benefits which come from a bureau of this kind. I do not believe that the farmers would desire to have it discontinued now, as they have found out the value it is to them individually and collectively.

The State board of agriculture, under whose control this service is operated, have been of the greatest assistance to the director in forwarding the interests of the service, and have done a great deal of hard work to bring the service to its present efficiency.

In closing this report I wish to commend the work of the assistant director, E. H. Nimmo, who, by his intelligent and faithful performance of the duties assigned him, has greatly aided the director.

Very respectfully, your obedient servant,

N. B. CONGER,
Sergeant, Signal Corps, Director.

The CHIEF SIGNAL OFFICER,
Washington, D. C.

WEATHER CROP BULLETIN OF THE MICHIGAN WEATHER SERVICE.

[Co-operating with the United States Signal Service.]

CENTRAL OFFICE,
Lansing, July 21, 1888.

The voluntary observers of the Michigan weather service have furnished the data for this report.

Temperature.—The mean temperature for the week, 68.6°, is 4.3° below the normal. The highest temperature, 89°, occurred on the 17th, and the lowest, 48°, occurred on the 16th.

The daily temperature.

Date	13	14	15	16	17	18	19
Normal	74	73	74	75	73	71	70
Daily average	63	65	67	70	74	72	69

Rainfall.—The average total rainfall for the week, .10 inch, is .67 inch below the normal. The rainfall was recorded on the 18th, and was badly distributed.

The rainfall.

Date	13	14	15	16	17	18	19
Normal	.11	.11	.11	.11	.11	.11	.11
Average total for day	.00	.00	.00	.00	.....	.10	.00

Sunshine.—The amount of sunshine was slightly above the average, with unfavorable effects on the corn and potato crops, but very favorable to harvesting.

Results.—The weather conditions for the past week have been very favorable to harvesting, and the hay is about all secured. The wheat harvest is progressing rapidly,

and is nearly finished in the southern tier of counties, and some thrashing is reported in Monroe County. The wheat in the northern section is now ripening rapidly. Corn, oats, and potatoes are beginning to suffer from the lack of rain, and the complaints from this cause come from all sections. Clover and timothy in Kalkaska County is reported as being light, and has suffered from the lack of rain to some extent.

N. B. CONGER,
Sergeant, Signal Corps, Director

[Inclosure IX.]

MINNESOTA STATE WEATHER SERVICE.

Report of the Minnesota State Weather Service since June, 1887.

CARLETON COLLEGE OBSERVATORY,
Northfield, March 19, 1888.

SIR: The director of this weather service has labored under some serious disadvantages during the past year that makes the following report less encouraging than it otherwise would be. The territory covered by this service in June of 1887 was Northern Iowa, Western Wisconsin, Minnesota, and Dakota. In this district were located about 35 stations having full or partial sets of standard mateorological instruments reporting with a fair degree of regularity to the central office, at the Chamber of Commerce, in the city of Saint Paul, monthly, and at other times as desired, in the interest of growing crops. In our district at the same time there were about 75 flag stations receiving indications daily (Sundays excepted) from the central station in Saint Paul.

* * * * * * *

After the passage of the interstate-commerce law free transportation for the director and his assistant was recalled, and it has since been impossible, on account of the expense, to make regular and needful visitations to observing stations for the instruction of observers and examination of instruments.

In the autumn of 1887 the Chief Signal Officer established a branch indications office in Saint Paul with office in the Chamber of Commerce building. This was a wise and useful step, and great good resulted from it in the matter of improved indications for daily use in all the Northwest. During the six months of trial of this service we know the people came to appreciate it more than ever before, because they could rely on it more certainly than ever before. It is to be regretted that, even for good reason, this service should have been discontinued. The only thing lacking, in the judgment of the director, to have made that service almost perfect was a few more stations and a better telegraph service. The State service and the railroad companies offered to supply the stations without cost to the United States service, but the officer in charge of the indications branch said such stations were not needed, and hence no attempt has been made to organize more. This being the decision of the United States officer of the service on the ground, the railroad companies of course withdrew all support, which has greatly weakened the efficiency of this State service. It should be said right here, that the Chief Signal Officer, General Greely, or his assistant, Lieutenant Dunwoody, were in no way responsible for this loss to the State service. Both of these officers have always been friendly to the State services, and aided them in all ways and under all circumstances possible.

Early in the present year the territory of this service was changed to include only Minnesota and Dakota. This reduced the number of instrument stations and flag stations fully one-third. The flag stations, however, have again reached seventy-five in number, and nearly all stations have adopted Government code, which works well and is more simple and less expensive than the Ohio system, so called.

At a meeting of the meteorological committee of the Chamber of Commeree in Saint Paul a few days ago to discuss the needs of the State service, at which the director was present, it was decided to furnish the means necessary to carry on the service during the remainder of the year, and to ask the legislature of this winter for an annual appropriation to defray its expenses hereafter. The friends of the service are hopeful of success.

Respectfully submitted.

WM. W. PAYNE,
Director.

The CHIEF SIGNAL OFFICER.

WEEKLY WEATHER-CROP BULLETIN OF THE MINNESOTA WEATHER SERVICE.

[In co-operation with the United States Signal Service.]

SAINT PAUL, MINN.,
Saturday, August 25, 1888.

The weather for the past week was all that could be desired for crops and farming operations. The temperature was seasonable, with an abundance of sunshine. Very little rain is reported this week. Following are the stations where precipitation occurred: Rolling Green, .75 inch; Saint Vincent, .39; La Crosse, .12; and Marshall, "light fall."

Harvesting is about completed in the southern divisions of Minnesota and Dakota, and the work progressed rapidly in the northern parts of the State and Territory.

REMARKS OF OBSERVERS.

Saint Vincent.—Barley cutting nearly over. Some wheat has been cut. Farmers report wheat damaged slightly by the frost of last week.

Moorhead.—Very warm and dry, and favorable to harvesting, which is in full blast.

Perham.—Very dry here. The frost of last week has done more damage to corn and other produce than was first anticipated. Corn fodder is a total loss. Late wheat and potatoes are badly damaged.

Morris.—Fine weather; harvesting nearly finished.

Marshall.—Wheat has been severely damaged by wet weather.

Farmington.—Nice weather for harvest and threshing oats, yielding 25 to 30 bushels per acre, and light. No wheat.

Glencoe.—Wheat and oats are all harvested. The past week has been splendid weather. Threshing has just commenced. Can not tell the yield yet. Think there will be two-thirds of a crop of wheat and oats. Corn is looking well.

La Crosse.—Weather past seven days has been just what was wished, and crop prospects are consequently much brighter.

Rolling Green.—Flax, grass, and potatoes doing well. Corn hanging. Stacking general.

W. W. PAYNE,
Director.
JOHN HEALY,
Private, Signal Corps, Assistant.

Report of the director to the meteorological committee of the Saint Paul Chamber of Commerce.

ORIGIN OF THE MINNESOTA WEATHER SERVICE.

July 30, 1880, a letter was written to Hon. Alexander Ramsey, then Secretary of War, requesting that Carleton College be designated as a station for signal-service observations, and that the necessary meteorological instruments be furnished by the Chief Signal Officer for the same. The station was desired for the purposes of instruction for scientific students of the college and regular observations and records. December 1, following, the college was so designated, and a partial outfit of instruments supplied from Washington, but the remainder necessary to make a complete station for all kinds of meteorological records was purchased by the college.

May 26, 1881, President Strong, of the college, received a letter from Governor John S. Pillsbury, calling his attention to the benefits that might accrue from a systematic collection of meteorological data by the educational institutions of the State. We give an extract from that letter showing the governor's just appreciation of such data. He said:

"There can be little doubt but that the careful collection and utilization of local climatic data could be made to subserve valuable practical purposes pertaining to agriculture, health, etc., were we provided with adequate means for obtaining the detailed and extended information requisite. In the absence of these it has occurred to me that an approach to the desired result can be obtained by observations and reports to be made by our various educational institutions kindly volunteering their services. With this view I venture to inclose the memorandum issued by the Weather Bureau (at Washington) and to solicit your interest and aid in the matter, calling special attention to the offers made in the same."

The memorandum referred to, from General Hazen, bearing date April 11, 1881, which appeared in the daily papers at the time, was as follows:

"Experience has, however, shown in many questions relating to agriculture and other interests, more minute details are needed, such as can only be obtained by having at least one report from every county, and this extension of the work must, for the present, devolve upon the individual States. It is considered desirable that each State should, as far as practicable, establish some such system as is suggested in the accompanying memorandum:

"I shall be pleased to learn from you whether there is any officer of your State authorized to assume charge of weather observations and climatic statistics, upon whom the duty of organizing such work can be imposed by you, or whether special legislation will be required to enable you to establish a weather service in your State. This office will be glad to co-operate in the development of meterological services in the respective States."

The reply to this letter gave the information that Carleton College had already undertaken that service in the fullest way possible.

The next step in the service was the action taken by the Chamber of Commerce of Saint Paul in establishing a time-ball for the city. This feature of public interest was proposed by Mr. Thomas Cochran, then a prominent member of the chamber, and successfully carried to completion by his personal attention. The Chief Signal Officer furnished daily service in connection with the time-ball, and telegraphic time-signals were first automatically given from the observatory clock of Carleton College, but later by a transmitting clock because of the wretched service of the Western Union Telegraph Company. This service began in September, 1881. It was apparently appreciated by the business men of the city, and certainly a credit to the enterprise of the Saint Paul Chamber of Commerce.

June 12, 1883, the present director of this service received a letter from General Hazen, the Chief Signal Officer, from which the following extract is taken:

"I have the honor to invite your attention to the subject of organizing a State weather service in Minnesota. The States of Ohio, New Jersey, Indiana, Illinois, Michigan, Iowa, Missouri, Kansas, Nebraska, and Tennessee have each organized a State weather service, and the benefits already received are great, and induce me to ask your co-operation in affecting a similar organization in Minnesota.

"The general plan of these services is as follows: The observers in the several counties of the State furnish to the central observer of the State a monthly report of rainfall, temperature, and miscellaneous data of interest and benefit. These reports are examined and a summary forwarded to this office and to each individual observer. Newspapers also gladly publish any data given them by the central office. The benefits attending the service when properly organized are apparent and the data collected is useful to all interested in agriculture, horticulture, and kindered pursuits."

In the month of November, 1883, Lieut. H. H. C. Dunwoody, from the Chief Signal Office at Washington, D. C., visited the observatory at Carleton College and proposed that a weather service for the State of Minnesota be organized, and that the central office be located at Northfield. After due deliberation the college authorities decided to undertake the work, and it was assigned to the department of mathematics and astronomy. The Chief Signal Officer requested the director of the observatory to act as director of the weather service for the State, and very kindly gave aid and much personal attention to the organization, which was wholly on a voluntary plan. The spring and summer of 1884 were used by the director in visiting every important town in Minnesota for the purpose of establishing stations with meteorological instruments and making necessary arrangements for regular observations, records, and reports. Prominent towns and cities were induced to purchase standard meteorological instruments and to secure proper persons to take observations and make the necessary records. About thirty-five stations were secured in this way at an expense of $1,500, which was borne wholly by the college. The mode of organization then used is set forth in the following circular:

"The plan of the service is, to have a central State office and a State director, and at least one voluntary observer in each county, who will keep a record of temperature and rainfall, and report the same to the central office of the State, at such times and in such ways the Chief Signal Officer at Washington shall plan for or request.

"County observers wishing to make continuous records of wind force, humidity, and the barometer will be aided in all possible ways, both by the State and the Government service; for such observations are locally of equal value to those of temperature and rainfall.

"The State director will supply from the Chief Signal Officer at Washington the instruments necessary for all the observations spoken of above at greatly reduced cost from catalogue prices. These instruments will be compared with the Government standards at the Chief Signal Office, and a memorandum of errors of all will be furnished to each local

observer, so that a uniform system of observations is secured for the weather service of the entire country. The central State office will also furnish, free of charge, to all local stations the necessary blanks, instructions, Monthly Weather Review, reports of the State weather service, and all other useful information communicated by the Chief Signal Officer at Washington for that purpose.

"Attention is asked to the following advantages of a State weather service:

"(1) It will bring the benefits of the Signal Service of the United States into every county of Minnesota participating in the State service.

"(2) It will be the means of soon securing better predictions of weather changes and storms so much needed in the Northwest.

"(3) It will soon prepare Minnesota for a system of storm signals displayed from railway trains that will be widely beneficial to agricultural interests.

"(4) It will give to every county the Government standards for temperature, rainfall, wind-velocity, humidity, etc., which are sources of useful public information.

"(5) It will put within the reach of local agricultural societies means of accurate observation, which, in the course of years, must be valuable to any locality in the study and adaptation of cereals.

"(6) It will bring the science and methods of the national Signal Service within the reach of the principal high schools of the State, offering teachers and pupils alike excellent opportunities to study a wide range of the application of science to foster and protect agricultural industry.

"(7. For about $15 the instruments for temperature and rainfall can be secured. For about $125 the equipment of a full signal service station can be furnished and put in working order. To take the observations requires but little time daily, and the exercise is especially agreeable to those that are interested in natural science. Any person so disposed will probably not find it difficult to raise the necessary means to buy all instruments wanted for a complete station at the county seat of each county; for various interests are to be served, and, in all probability, liberal people who naturally have interest in useful science will cheerfully contribute for such an enterprise."

CO-OPERATION WITH THE UNITED STATES SIGNAL SERVICE.

The above plan was submitted to General Hazen, and received his approval in the month of August, 1884, and September 5 following a Signal Service observer was promised who should act as assistant to the director in the State service and have charge of the central office in the interest of the State service and of the Signal Service of the United States. This step on the part of the Chief Signal Officer was a new one, and the experiment was first tried in the Minnesota service. Private David R. McGinnis was first assigned to duty at the central station in Northfield, and began service in the month of November, 1884, publishing his first report for the month of December following.

During the years of 1883 and 1884 the monthly summaries of meteorological and astronomical observations of popular interest had been regularly sent to nearly one hundred country newspapers of the State, all of which having requested the information for publication in amount as should be convenient.

CROP REPORTS.

Beginning with January, 1885, an attempt was made to secure reports concerning the condition of the live-stock of the State and parts of the United States of general interest, and to lay plans for securing reports on the condition of crops for the ensuing season. In the months that followed these reports proved to be a feature of popular interest to those engaged in stock-raising and agriculture. They were generally appreciated, and drew favorable public attention to the value of the service.

THE UNIVERSITY OF MINNESOTA.

On this account the University of Minnesota claimed that the State weather service should belong to that institution, and a special committee of the faculty, by means rather questionable in courtesy and propriety, strongly pressed its claim with the Chief Signal Officer in Washington by demanding a similar service. Private McGinnis was secretly and discreditably involved in this, under the promise (as he said) of gaining a professorship in the university at a salary of $1,500. This, however, was later denied by the officials of the university.

The friendly conference between the regents of the University and the trustees of Carleton College, though lasting several months, resulted in no change. There were obstacles that seriously opposed the organization of it as had been planned.

COLD-WAVE WARNINGS.

In the month of September, 1885, the State service undertook the distribution of cold-wave warnings by the assistance and direction of the Chief Signal Officer. This step was taken with extreme caution by the officers in charge, in view of the known uncertainty of data upon which cold-wave predictions must be made for the Northwest. Five stations for such warnings were first tried in Minnesota with results more favorable than expected.

TRANSFER OF SERVICE TO THE SAINT PAUL CHAMBER OF COMMERCE.

For reasons that need not be given here, Carleton College deemed it wise to transfer the central station of the weather service from Northfield to the Chamber of Commerce of Saint Paul, especially as that influential corporation was willing to take supervision of the service and meet all its needful expenses. The transfer was made in January, 1886, the director retaining his position as before. February 2, 1886, the following letter was received from General Hazen:

"You are respectfully invited to attend a meeting of the chiefs of State weather services, members of meteorological societies, and others specially interested in the meteorological work of State or local organizations, to be held in the lecture hall of the Smithsonian Institution on Wednesday and Thursday, February 24 and 25. A general discussion of the various subjects which may be suggested at this convention will doubtless result in uniform methods of observing and recording observations, and it is also believed that by a general interchange of the views on the subject of signal service reports and special weather forecasts these reports may be made more valuable to your section through improved methods of distribution which may be suggested in this discussion."

The director of this service attended that meeting and there met representatives of nearly every other State service in the United States. The meeting was a most profitable one, as it enabled the State service men to compare methods, to discuss doubtful questions, and to decide new lines of endeavor, especially those pertaining to the display of flags and the distribution of daily indications by telegraph.

THE CO-OPERATION OF RAILWAY COMPANIES.

As a means of starting the service daily by telegraph to the towns and cities of Minnesota the Chief Signal Officer offered to meet the expense of sending one telegram daily over each of the ten railway lines then reaching Saint Paul and Minneapolis, or tributary thereto.

* * * * * * *

The attention of the officials of the several railway companies was called to this matter, and with but very few exceptions the service was assumed by their respective companies and performed for the State service free of charge, and with great faithfulness generally. These were the Saint Paul, Minneapolis and Manitoba Railway; the Chicago, Milwaukee and Saint Paul Railway; the Chicago, Saint Paul, Minneapolis and Omaha Railway (for a short time); the Minneapolis and Saint Louis Railway; the Saint Paul and Duluth Railway, and the Minnesota and Northwestern Railway.

The officials of these companies were also very liberal in giving free transportation to the director and his assistant for all needful travel in the interest of the service. This arrangement was continued for more than a year.

* * * * * * *

FLAG SERVICE.

The service for daily indications by railway telegraph began June, 1886, and in September forty flag stations were in operation, all receiving daily indications at 7.30 o'clock in the morning and displaying the flags usually at 8 o'clock.

These stations are located in Iowa, Dakota, Wisconsin, and Minnesota. In July, 1886, Private McGinnis was discharged from the Signal Service Corps, and in the month of September following Private E. C. Brandenburg was assigned to his place.

TRANSFER OF TELEGRAPH SERVICE.

The next change in the management of the weather service was due to a transfer of the telegraph service from the railroad companies above named to the Western Union Company. This was done through an agreement between the executive officers of the Western Union Company in New York and the Chief Signal Officer, General A. W. Greely, in which the Western Union Company offered to perform the service at very low rates. * * * * By suggestion of the Chief Signal Officer the transfer to the Western

Union Company was completed on the 25th day of September, 1887, and the following circular was sent to all observers in Iowa, Wisconsin, Minnesota, and Dakota:

"On and after Wednesday, September 26, flagmen of the Minnesota weather service will find daily weather messages at the city offices of the Western Union Telegraph Company in all towns and cities having such offices; in other cases at railroad offices as heretofore.

"Messages will be ready for delivery at 7.30 a. m. daily (except Sunday) and should be called for before 8 o'clock a. m., which is the time for display of flags."

Very unsatisfactory service from that day to the present time has been given by the Western Union Company.

* * * * * * *

SAINT PAUL AS A BRANCH INDICATIONS OFFICE.

The director and chairman of the meteorological committee of the chamber of commerce prepared a lengthy paper setting out the needs of the Northwest in the matter of improved signal service, and presented the same to General Greely in the early autumn of 1887. The Chief Signal Officer very kindly and favorably considered the matter, and decided to establish a branch indications office at Saint Paul instead of Chicago, as inclination was leading him prior to this time. His views, as expressed freely to the director in conversation at his office, were entirely favorable to the plan of State weather services, and he manifested a hearty interest in sustaining them. The branch office was opened in Saint Paul October 15, 1887, as elsewhere stated.

EXPENSES OF THE SERVICE.

The expenses of the Minnesota weather service since January, 1886, have been borne by the chamber of commerce of Saint Paul, and have amounted to nearly $600 annually. These funds have been used for printing, traveling expenses for maintaining observing stations, and office expenses for the central station.

The chamber of commerce has furnished office and furniture free of charge for the central station and the director has donated his time to the service. The Chief Signal Officer sends all indications messages at Government expense.

There is on file with the chairman of the meteorological committee a statement of expenses and disbursements made since February 1, 1886.

APPRECIATION OF THE SERVICE.

In March, 1887, the director of this service desired to know if the weather service and the generous efforts of the chamber of commerce to maintain it were appreciated. Accordingly a circular-letter was addressed to all observers and flagmen, requesting opinions of business men concerning its usefulness and the desirability of continuing it. Replies came from about thirty stations containing words of commendation of the service from nearly five hundred business men in the several towns and cities where stations are located. All these interesting communications are on file with the chairman of the meteorological committee.

WM. W. PAYNE,
Director.

[Inclosure X.]

MISSISSIPPI STATE WEATHER SERVICE.

OFFICE OF THE STATE WEATHER SERVICE,
University of Mississippi, July 24, 1888.

SIR: I have the honor to respectfully submit the following report of the work of the Mississippi State weather service, in co-operation with the United States Signal Service, for the year ending June 30, 1888.

The branches of work undertaken during the preceding year have been continued and enlarged during the year just closed.

The number of stations making monthly reports of temperature and rainfall to this service has increased from 22 in June, 1887, to 36 in June, 1888.

The number of stations receiving daily weather indications in June, 1887, was 21, and in June, 1888, 34.

The number of stations receiving cold-wave warnings winter before last was 8; and *last winter 34.*

The average number of observers reporting crop conditions this season is 18, and plans are ready for execution, which will doubtless result in doubling this number.

An effort to secure copies of private records of rainfall and temperature in this State, running back into past years, resulted in obtaining valuable data from 13 different localities, copies of which have been transmitted to the Chief Signal Officer.

The study of the climatology of the State by this service has been appreciated by the public, and the results worked out have been freely used by public speakers and the press in setting forth the agricultural and other advantages of this State.

During last season more than fifteen towns were supplied with the cold-wave warnings of the United States Signal Service with special reference to the protection of the early fruit and vegetable interests, thousands of acres being in these localities devoted to this culture for the supply of northern markets.

These warnings are of special value in Mississippi, where early vegetation is always liable to be injured by late frosts, and where the postal arrangements are such that the daily newspapers containing weather indications do not reach most of our towns until late in the afternoon of the day of publication.

Efforts made last winter to secure a fund from the State for prosecuting the work of the weather service were not successful, the last legislature being apparently determined to curtail every expenditure from the State treasury. The growing appreciation of the work of the service will increase the chances of securing State aid in the future, and the matter will be urged before the next legislature.

At my request the trustees of the University of Mississippi continue to meet the expenses of the service for printing bulletins and circulars. The outlook for the increased usefulness of the service is very encouraging. The public is being educated to appreciate and understand its aims and its methods. If the service continues to grow as it has during the last two years, there is no doubt that the legislature will sustain it, and that the railroads will materially aid it in disseminating the indications of the United States Signal Service.

I am aware of the difficulties in the way of affording storm-warnings on the Gulf coast of this State, but I venture respectfully to repeat the suggestion made in my last report, that such warnings might be made of great benefit to the very large fishing and lumber interests of Mississippi Sound.

To the faithfulness and efficiency of Sergt. M. J. Wright, Signal Corps, the success of the work is largely due.

I have the honor to be, most respectfully, yours,

ROBERT B. FULTON,
Director, Mississippi Weather Service.

The CHIEF SIGNAL OFFICER.

Weather crop bulletin of the Mississippi weather service for the week ending Saturday, September 15, 1888.

[In co-operation with the United States Signal Service.]

UNIVERSITY OF MISSISSIPPI,
September 15, 1888.

Rainfall.—For the past week the rainfall has been about the average, and affected crops favorably.

Temperature and sunshine.—The temperature is generally reported about the average, with a liberal amount of sunshine, which was beneficial to crops.

Crop conditions.—The dry weather and sunshine have materially improved the condition of crops. The outlook is better and farmers encouraged. Cotton-picking progressing rapidly.

SPECIAL ITEMS.

Oxford.—Perfect weather during past week.
Batesville.—Prospects of a larger crop than last year.
Greenville.—Condition of crops improving under favorable weather.
Artonish Plantation.—Crops in bad condition.
Holly Springs.—Cotton opening rapidly; picking becoming general.
Mobile.—Condition during past week more favorable.
Palo Alto.—The fine weather has cheered up farmers and made things lively.

Peach Grove.—Splendid weather for saving hay.
Coldwater.—Wind and sunshine dried up low places.
Coffeeville.—The crops are showing better this week.
Pearlington.—Frequent showers injurious to hay crop.
Vicksburg.—The past week has been just the weather desired by planters for maturing crops.

R. B. FULTON,
Director.
M. J. WRIGHT, Jr.,
Sergeant, Signal Corps, Assistant.

[Inclosure XI.]

MISSOURI STATE WEATHER SERVICE.

SAINT LOUIS, *August* 23, 1887.

DEAR SIR: During the past year the efficiency of the Missouri weather service has been very materially increased. This is due mainly to the increase in the force, Sergt. G. A. Weber having been detailed to assist the director. For the first time it has been possible to verify the reductions of the observers by a recalculation of the monthly values. The number of observers has also increased in a very gratifying way, and a more general interest in weather observations is being awakened in the State. Weekly summaries of weather and crops are now being published, these reports being made up in part from weekly reports of weather observers and in part from other persons who make such reports only. During the year a report on Missouri rainfall has been prepared, based on the observations of twenty-five stations, which present series extending over ten years, during which the weather service has been in existence, and on the records of eleven stations which present records of over ten years, one record covering forty-two years. Charts of average rainfall, based on the ten-year observations, have been constructed upon the map of Missouri for each month and season and for the year. All values have been recalculated by Sergeant Weber from the original daily observations of the various stations.

This publication will be made by the Saint Louis Academy of Science. It is regretted that the State authorities could not also accept this report for publication as a State document by reason of a lack of funds.

Since 1882 no attempt has been made to secure the organization of the weather service as a State institution, the experience of that year having been very discouraging indeed. The expense of operation above that represented by the assistance of the Signal Service is supplied by the director.

For the further development of the Missouri weather service, it would be of great value to distribute compared maxium and minimum thermometers to some of the trustworthy observers who have served so faithfully during the last ten years. These thermometers ought to be supplied by the State, and although $400 would cover the cost of the instruments and shelters that would be now required, there is not much hope of securing it.

For State weather services, where volunteer observers must necessarily be used, the maximum and minimum thermometers are much to be preferred, as the observer is not so closely tied down to regular hours of observation. The rain-guages now in use have for the most part been in use for ten years, and as they were made of tinned iron, they are beginning to give some trouble from leaking. They should all be replaced by the standard guage adopted by the Signal Service.

It is certain that the State weather service is destined to become a most useful institution, bearing in some respects the same relation to the national Weather Service that the State government does to the national. The climate of each State should be studied by a State weather service, supported by the Government. It is also certain that the local summer storms which are of such importance to the farmer can only be predicted by a local weather service. The behavior of these storms should receive careful attention from all State services. This can be done as soon as the States will pay some one to do it. When the telephone shall have become public property, so that it will become available for general service at reasonable rates, we shall have county telephone services, with lines reaching the principal farms of each county. The advantages of such telephone service to farmers, especially during harvest time, are too many and too obvious to require recital. One advantage will be a system of local storm-warnings, which can be

carried on, and which will save millions of dollars that are now wasted. The State weather service will then also be in a condition to efficiently distribute the predictions of cold waves and larger storms which may be made by the national service.

Very respectfully,

FRANCIS E. NIPHER,
Director, Missouri Weather Service.

The CHIEF SIGNAL OFFICER.

Weather Crop Bulletin of the Missouri Weather Service for the week ending Saturday, August 25, 1888.

[In co-operation with the United States Signal Service.]

Rainfall.—The rainfall was reported above the average in the following counties: Barton, Bollinger, Cape Girardeau, Carter, Cass, Gasconade, Howell, Iron, Jefferson, Lincoln, Mississippi, Moniteau, New Madrid, Nodaway, Oregon, Perry, and Reynolds. An average rainfall was reported in Clarke, Crawford, Knox, LaClede, Lafayette, Maries, Miller, Phelps, Pike, and Saint Louis Counties. A deficiency of rainfall was reported in Audrain, Bates, Boone, Clay, Chariton, Marion, Mercer, Monroe, and Shelby Counties.

Temperature.—The temperature throughout the State was slightly below the seasonal average. Light frost is reported in Monroe County.

Sunshine.—There was much cloudiness in the southeast section of the State. In all other sections an average amount of sunshine is reported.

General effects.—A remarkable feature of the rainfall distribution during the week is that the most rain fell in the south and southeast sections, where heretofore dry weather prevailed; and the least rain fell in the north, where rains had been the most abundant. The effect was favorable in the south, where the soil was put in good condition for fall plowing, and all vegetation was revived. In the north dry weather was needed to ripen the corn. In some counties in the southeast the corn was injured by wind and heavy rains. In general, however, the corn is reported better than was expected in the southeast. The cool weather did not have much effect upon vegetation.

F. E. NIPHER,
Director.
G. A. WEBER,
Sergeant, Signal Corps, Assistant.

[Inclosure XII.]

NEBRASKA STATE WEATHER SERVICE.

BOSWELL OBSERVATORY, DOANE COLLEGE,
Crete, Nebr., June 26, 1888.

SIR: I have the honor to submit herewith the report of the operations of the Nebraska weather service for the year ending June 30, 1888.

I am, very truly, yours,

GOODWIN D. SWEZEY,
Director.

Lieut. H. H. C. DUNWOODY.

NEBRASKA STATE WEATHER SERVICE.

Annual report, year ending June 30, 1888.

The Nebraska State weather service has continued during the past year under the same management and following essentially the same line of operations as during the previous year. New observer have been obtained and a more general distribution of information among the people has been accomplished.

STATIONS AND OBSERVERS.

The following is the list of stations and observers reported during the year:

Station.	Observer.	Station.	Observer.
Southeast section:		Niobrara Basin:	
Ashland	George Shedd.	Creighton	Dr. Geo. Roberts.
Crete	G. I. Gilbert.	Hay Springs	Wm. Waterman.
De Witt	F. C. Ware.	Valentine	C. S. Gorgas.
Fairbury	Dr. Humphrey.	Lower Loup Basin:	
Falls City	A. B. Newkirk.	North Loup	M. B. C. True.
Marquette	J. Ellis.	Palmer	C. Shieldstream.
Mead	A. G. Thompson.	Ravenna	E. Smith.
Minden	Joel Hull.	West Hill	J. L. Truman.
Nebraska City	J. B. Parmalee.	Upper Loup Basin:	
Stromsburg	S. S. Kauffman.	Sargent	J. S. Spooner.
Syracuse	P. W. Risser.	Republican Basin:	
Weeping Water	G. Treat.	Franklin	W. A. Harshbargar.
Northeast section:		Red Willow	Mrs. R. Buck.
De Soto	Charles Seltz.	Upper Platte Basin:	
Fremont	I. E. Heaton.	Kimball	Wm. C. Barton.
Norfolk	L. Sessions.	North Platte	J. Fitzgerald.
Omaha	George M. Chappel.		
Scribner	Jesse A. Nason.		
West Point	E. G. Bruner.		

Of these Franklin, Kimball, North Loup, and Valentine have been added during the year, and are situated in the newer and less settled portions of the State.

Most of the observers report only temperature, precipitation, wind, sky, and occasional phenomena. together with the conditions and prospects of crops; a few are provided with maximum and minimum thermometers, while the three United States Signal Service stations, Omaha, North Platte, and Valentine, furnish the full monthly meteorological summaries.

INDICATIONS.

There have been sent out from this office by mail daily the special 10 a. m. predictions for Nebraska to the following easily accessible stations to be posted in the post-offices and in some cases for the display of flags:

STATIONS.

Minden.	Ayr.	South Bend.
Exeter.	Ong.	Syracuse.
Kenesaw.	Waverley.	Western.
Staplehurst.	Fairmont.	Ulysses.
Cedar Creek.	Ashland.	Wymore.
Blue Springs.	Grafton.	Holmesville.
Blue Hill.	Greenwood.	Inland.

The following stations, selected and arranged for by this service, have received the 1 a. m. predictions by telegraph and have displayed flags and made monthly reports:

Station.	Flagman.	Station.	Flagman.
Edgar	Neal Brothers.	Wymore	George Laflin.
Louisville	Thomas Shryock.	Grand Island	C. L. Howell.
Juniata	S. L. Brass.	Falls City	A. B. Newkirk.
Aurora	John Tweedy.	Tecumseh	C. M. Wilson.
Norfolk	P. T. Grecher.	Merna	E. R. Purcell.
Harvard	M. S. Wistrom.	Superior	George G. Spohr.
Weeping Water	J. K. Keithley.	Franklin	W. A. Harshbargar.
Stromsburgh	George S. Osborne.	Western	H. Porter.
Plattsmouth	J. N. Wise.	Tobias	S. Larson.
Seward	John Kittle.	De Witt	A. H. Dennison.
Broken Bow	R. Ryerson.	Chester	Stephen Forsdick.
Peru	W. C. Purviance.	Tamora	J. S. Williams.
David City	Frank A. Snow.	Nelson	The Nelsonian.

WEEKLY CROP REPORT.

The observers of this service have reported weekly by mail to this office the condition and prospects of crops, to serve as the basis for a telegram on Saturday night to the Chief Signal Officer to aid in the preparation of the weekly crop bulletin furnished by him to the press.

MONTHLY BULLETIN.

There has been issued by the central office a four-page monthly weather and crop bulletin, with map of the distribution of precipitation, and these have been sent out for republication by the press of the State.

GOODWIN D. SWEZEY,
Director.
C. D. BURNLEY,
Private, Signal Corps, Assistant.

BOSWELL OBSERVATORY, DOANE COLLEGE,
Crete, Nebr.

Weather crop bulletin of the Nebraska weather service, July 21, 1888.

The observers of the Nebraska weather service furnish the following data concerning the effect of weather on the crops:

Rainfall has been about the average in the eastern part of the State, and above the average in the southern and central parts of the State.

There has been throughout an average amount of sunshine, and the temperature has been normal.

The effect on all crops has been very favorable in all parts of the State.

Harvest is well under way in the southern counties, and beginning in the central part.

Chinch bugs are reported as damaging the wheat in the central part, but only in small districts.

Prospects for corn excellent.

G. D. SWEZEY,
Director.
C. D. BURNLEY,
Private, Signal Corps, Assistant.

[Inclosure XIII.]

NEVADA STATE WEATHER SERVICE.

CARSON CITY, NEV., *July* 31, 1888.

SIR: In response to your circular letter of June 5, 1888, I have the honor to submit the following report of the Nevada State weather service for the year ending June 30, 1888:

The service was established by act of legislature in February, 1887, a copy of act being herewith inclosed. Immediately upon the passage of the act a director was appointed, but no stations of observation were established until the following September, the interim being occupied in procuring instruments and in the consideration of plans for the organization and management of the service. In June, 1887, the Chief Signal Officer detailed a Signal Service observer as assistant to the director. The assistant arrived at this place on August 9, and immediately upon his arrival the work of shipping the instruments and instructing the observers was begun. Fourteen stations were equipped with instruments in September, one in each county, the county auditors being by section 8 of the act constituted *ex officio* State weather service observers. The number of stations has since been increased to thirty-seven. Of these seventeen stations make tri-daily observations of air temperature, precipitation, wind direction, and state of weather, together with notes upon the occurrence of casual phenomena, such as frosts, halos, thunder-storms, etc.; five are special rainfall stations, and the remainder make

observations once daily of maximum and minimum temperature, precipitation, wind direction, and state of weather.

The stations are tolerably well distributed throughout the most important sections of the State. There are, however, yet some unoccupied districts in which it is hoped that in the future, as the influence of the service extends, it will be possible to establish stations; and it is probable that within a few years there will be made and preserved a fairly accurate record of the leading features of the climate of nearly every section of Nevada.

At first the work of the observers was not very satisfactory, owing to the indifference of some and the incompetency of others; but after devoting much time and labor to urging upon them the necessity of care and accuracy and to arousing in them a sense of the importance of their work, a very decided improvement took place, and in most cases the work of the observers is now as satisfactory as could be expected.

In September, 1887, a circular letter was sent to all the teachers in the State, soliciting their co-operation and urging them to procure instruments and make observations at their schools. The object of this was, first, to obtain reports of the weather from as many points as possible, and, secondly and principally, to secure the training of the pupils in the use of the simple meteorological instruments, and to diffuse among them and the people generally a knowledge of the fundamental principles of the relations which climate bears to the every-day interests, both vital and material, of the human race. The most complete records of the climate of any country are of little practical use unless the people possess sufficient intelligence to make use of them; and it appears that the public schools afford the readiest, if not the best, means of diffusing the knowledge which makes possible an intelligent and practical application of observations of the weather. The first appeal to the teachers unfortunately met with but few responses. Efforts will, however, be made again this year to induce many of them to take an active interest in the matter. The subject will not only be presented to individual teachers, but it will also be urged upon them at their institutes, and the county superintendents of public instruction will be earnestly solicited to lend their influence and co-operation. In February, 1888, the publication of a monthly summary of observations, together with a general review of the weather, was begun. Five hundred copies are published monthly, and distributed to those who are most likely to appreciate and make use of them.

The purposes of the Nevada State weather service are to collect a fund of knowledge, as complete as possible, of the climatic features of every section of the State, from which reliable data can be furnished to actual and prospective settlers; to incite an interest among the people in the study of our climate, and to aid in making possible a practical application of the knowledge thus acquired; to assist in the development of our agricultural interests by the discussion of the problems of irrigation, storage of water, economy of water supply, and adaptation of soil and climate to specific crops; and, by co-operation with the Signal Service, to secure to our people the benefits of the indications and other work of the United States Weather Bureau.

From January to June, inclusive, of the current year the indications were telegraphed from San Francisco to nine towns in this State. The indications were generally verified, and they gave great satisfaction to the people. The display of weather signals in connection with the indications has been made only at Reno and at Carson City. In case of the resumption of the indications, endeavor will be made to give them a wider distribution through the agency of the railroad telegraph lines. The towns to which it is most important that the indications should be telegraphed are the following (these towns being located in the principal agricultural districts): Genoa, Carson, Dayton, Mason's Valley, Reno, Lovelock's, Golconda, Paradise Valley, Tuscarora, Elko, Halleck, Austin, and Eureka. To agricultural interests the indications are of greatest value and importance from March 1 to June 30, and to the lumber interests from October 1 to December 31.

The success of the Nevada State weather service has so far been very gratifying, far exceeding expectation. Many of the most prominent and intelligent people of the State have manifested a deep interest in its work, and its continuance appears to be very well assured. Efforts will be made to secure a larger appropriation from the next legislature, which meets in January, 1889; and if a sufficient appropriation is made, it is proposed to increase the efficiency of the service by providing each station with a suitable thermometer shelter, by inspecting all the stations, and personally instructing each observer.

Very respectfully, your obedient servant,

CHARLES W. FRIEND,
Director.

The CHIEF SIGNAL OFFICER,
Washington, D. C.

AN ACT to establish a weather-service station in Nevada and to provide for the appointment of a director thereof, and appropriating money to pay the expenses of the same.

The people of the State of Nevada, represented in senate and assembly, do enact as follows:

SEC. 1. The establishment of a weather-service station being necessary to secure as complete a history of the weather of Nevada as possible, in order to furnish trustworthy material for a study of its climate, to acquaint the people of the State and non-residents with the physical conditions of every locality, based upon reliable climatic data, thereby greatly benefiting the agricultural, commercial, manufacturing, and municipal interests, there is hereby established at Carson City, in this State, a central weather station, to be under the supervision of a competent director, to be appointed as hereinafter provided.

SEC. 2. The duties of said director shall be to establish volunteer weather stations throughout the State, at least one in each county, and to supervise the same; to receive reports from said volunteer weather stations, reduce the same to tabular form, and prepare and have printed monthly reports, copies of which shall be, by said director, sent to all colleges, high schools, hospitals, public libraries, agricultural societies, and newspaper proprietors who shall in writing request the same.

SEC. 3. Said director shall also prepare an annual report of his labors, and of the work done by the volunteer weather service, and present the same to the governor for publication. Fifteen hundred copies of said report shall be printed by the superintendent of State printing, of which five hundred shall be for the use of the State officers and one thousand for the use of the legislature. The superintendent of State printing shall do all printing necessary to carry out the requirements of this act and the secretary of state is authorized to furnish to said director whatever stationery he may need in the proper performance of his duty.

SEC. 4. Said director shall be appointed by the governor, and, in addition to the other duties required under the provisions of this act, he shall file with the State librarian monthly reports of the meteorological observations provided for in the third section of this act; and the same shall be carefully preserved by said librarian, and be open to inspection during office hours to any one applying therefor. For the performance of the duties prescribed by this act the director hereinbefore mentioned shall receive a salary of six hundred dollars a year, payable in monthly installments, upon the claims being allowed by the board of examiners, and said claims shall be paid as other claims against the State are paid, and shall be in full for all demands of said director, including traveling expenses.

SEC. 5. Said director is authorized to provide for the equipment of such volunteer weather stations as shall be established by him, of which there shall be at least one in each county, at a cost not exceeding twenty-five dollars for each station so established. Each station shall be supplied with the following instruments: One maximum thermometer, one minimum thermometer, one dry-bulb thermometer, one wet-bulb thermometer, one rain-gauge, with overflow attachment, and such other instruments as may be necessary, of which the cost shall not exceed the sum of twenty-five dollars for each station, as hereinbefore provided. Said director shall apply to the United States Central Signal Office in Washington, D. C., to have the weather stations in this State recognized and registered as volunteer stations, auxiliary to the United States Weather Service, and shall also apply for and receive the printed blanks, franked envelopes, and books of "instructions for voluntary observers of the Signal Service of the United States Army," and such other stationery as is usually supplied to volunteer observers. All instruments purchased with State funds by said director for use in any department of the weather service in this State, and all charts, maps, diagrams, and tabulated forms made by him in his official capacity, shall be the property of the State solely.

SEC. 6. For the purpose of paying the salary of the director herein mentioned during the years 1887 and 1888, the sum of twelve hundred dollars is hereby appropriated, out of any moneys in the general fund not otherwise appropriated.

SEC. 7. The sum of five hundred dollars is hereby appropriated, out of any moneys in the State treasury not otherwise appropriated, to be applied in purchasing the instruments provided for in the fifth section of this act.

SEC. 8. The county auditors of the respective counties of this State are hereby constituted volunteer reporters of meteorological observations, and shall keep and record such observations and reports as are required by the provisions of this act and report the same to the director of the State weather service station, and shall perform such duty without compensation additional to that now allowed by law for the performance of other duties of their office.

[Inclosure XIV.]

NEW ENGLAND METEOROLOGICAL SOCIETY.

PROVIDENCE, R. I., *June* 30, 1888.

DEAR SIR: I have the honor to inclose a report of the work of the New England Meteorological Society for the year ending to-day.

Yours very respectfully,

WINSLOW UPTON,
Secretary, New England Meteorological Society.

Report on the work of the New England Meteorological Society for the year ending June 30, 1888.

The routine work of the society has been carried on much as in previous years. Monthly bulletins have been issued, containing reports from 140 to 150 observers, principally of precipitation and temperature. Of these observers, 11 are in charge of stations of the United States Signal Service and 7 have been supplied with instruments by the Appalachian Mountain Club. It may be noted that many of the other observers are connected with water-works of towns and cities, some with large manufacturing establishments, and several are located on the summits of hills, one of which, Blue Hill, Mass., is the location of the best equipped private meteorological observatory in the country. A number of stations are equipped with self-registering apparatus.

Special investigations have been carried on by the society as follows: In the summer of 1887 the observations of thunder-storms was continued in much the same form as in previous years, the expense covered by a grant from the Bache fund of the National Academy; the large correspondence that it involved was in charge of Sergeant Oswell, under the direction of Professor Davis. Progress in the discussion of results has been retarded by the recent absence of Professor Davis. In the same summer a study of the sea breezes that occur along the coast was begun, it being the first systematic study of the kind that has been attempted; this was in charge of Mr. L. G. Schultz, of the Signal Service, at that time stationed in Boston, under the direction of Professor Davis. The expense of printing circulars, etc., was borne by the Harvard College Observatory. The discussion of the results has progressed towards completion; but has been retarded by the transfer of Mr. Schultz to Ithaca, N. Y., as well as by the absence of Professor Davis. Both of these studies were greatly aided by the co-operation of the Signal Service, from whom the society received the assistance of a member of the corps.

In March, 1888, the secretary made a special study of the severe blizzard that spent its force in southern New England, with heavy snowfall and high winds. The results of this study were published in the American Meteorological Journal for May, 1888. The society received assistance in this undertaking from the trustees of the Elizabeth Thompson Science Fund. From the same source has been received a grant for defraying the expenses of a further study of cyclonic storms in New England, regarding which a series of papers was published in the American Meteorological Journal in 1886 and 1887.

During the year the society has made certain changes in its organization and association with other institutions. After the return of Professor Upton from absence of a year in Europe, he was chosen secretary, and Professor Davis, who had been acting as director in addition to his work as secretary, was made director. Since January, 1888, on account of the absence of Professor Davis from New England, the secretary has edited the Bulletin. At the beginning of the current calendar year an agreement was entered into with the astronomical observatory of Harvard College for joint publication of the observations of the society. As a result, the contents and form of the Bulletin have been somewhat changed, chiefly in the direction of a greater amount of tabular matter and an improvement in the style of printing. The Bulletin is printed monthly, as heretofore, and its permanent matter is stereotyped and will be published later in the volumes of Annals of the Observatory, together with an extended annual summary. The interest shown in meteorological studies by Prof. E. C. Pickering, director of the Observatory, and the expansion of meteorological work undertaken in consequence of the Boyden bequest, which is at the disposition of the observatory, insures the society many advantages from its co-operation with the observatory.

WINSLOW UPTON,
Secretary, New England Meteorological Society.

The CHIEF SIGNAL OFFICER,
Washington, D. C.

New England Weather Crop Bulletin.

CAMBRIDGE, MASS., *July* 7, 1888.

The New England Meteorological Society, in co-operation with the United States Signal Service, furnishes the following report of the weather and the condition of growing crops for the week ending July 6, 1888:

The rainfall has been below the average throughout New England. In some sections no rain has fallen during the week, but the effect has been quite favorable for all crops.

The temperature and sunshine have been about the average in all States excepting New Hampshire, where an excess is reported; the effect has been very favorable.

Haying has begun in northern New England, and the dry, sunshiny weather has been favorable for securing the crop, which promises to be large; in the southern portion the work is progressing well and about half of the crop has been secured.

On the evening of June 30 several places were visited by a severe hail-storm, which resulted in considerable injury to nearly all crops.

Reports from observers indicate that at Brunswick, Me., the hay crop has improved very much during the week, but it is thought by good judges that it will fall short, considerably, from last year. At East Sumner, Me., haying is just beginning, with a prospect of the best crop for years if favorable weather prevails during the haying season. At Hanover, N. H., the crops are looking finely and coming forward rapidly. There has been a good deal of sunshine and hot weather in the past seven days, but the ground is sufficiently moist to support crops well. Hay crop heavy. At Newton, N. H., no rain has fallen during the week, but all crops are doing well. The hay crop is good and being rapidly secured. At Brattleborough, Vt., it has been a fine week for securing the hay crop, which most of the farmers have improved to the best of their abilities; the amount and quality is far above the average. All other crops doing well. At Chelsea, Vt., an abundant hay crop is now assured. Its maturing will be somewhat late. At Cornwall, Vt., the season is fully up to the average. Potatoes and corn are looking well. Haying is progressing finely. At Craftsbury, Vt., a severe hail-storm occurred Saturday, cutting down the small grain to considerable extent. At Marlborough, Mass., a hail-storm of great severity occurred shortly after 6 o'clock Saturday evening. Fruit trees and vines were nearly all stripped, corn-stalks were broken off at the roots, and vegetable leaves were crushed or cut entirely off. At Taunton, Mass., hay is of fair quality, and the crop is about half secured.

O. N. OSWELL,
Sergeant, Signal Corps, Assistant.

[Inclosure XV.]

NEW JERSEY WEATHER SERVICE.

RUTGERS COLLEGE,
New Brunswick, N. J., July 23, 1888.

DEAR SIR: I have the honor to send this letter to accompany the annual report of Sergt. E. W. McGann, assistant in charge, upon the New Jersey weather service, for the year ending June 30, 1888. The service is gradually getting established in the minds of our citizens, and with continued work will come to be of great value to them. The work of Mr. McGann has been faithfully and intelligently carried on, and I can most heartily request for him the highest compensation for his services that is paid to any of them in charge of such services. The cost of living is as much as in New York or Philadelphia, and I trust you will be able to consider this and to recognize the valuable services of a worthy man and citizen.

Respectfully, yours,

GEO. H. COOK,
Director.

The CHIEF SIGNAL OFFICER,
Washington City.

STATE AGRICULTURAL COLLEGE,
New Brunswick, N. J., July 24, 1888.

SIR: I have the honor to submit the following report of the work of the New Jersey State weather service for the year ending June 30, 1888.

On the 21st of July, 1887, in obedience to instructions received from the Chief Signal Officer, I assumed charge of this station and the work of the State weather service connected therewith.

NUMBER OF STATIONS.

At that time the number of stations reporting to the central office was thirty-seven; of these seven have been discontinued for various reasons, and four new ones added, making the present total thirty-four, a decrease of three stations for 1888 as compared 1887.

REPORTS.

The reports received from these stations have been carefully summarized, tabulated, and published monthly in the New Jersey Weather Chronicle. The columns containing the data from these reports have been increased in number from four to fourteen, thereby presenting to the readers thereof a most valuable compendium of meteorological information.

WEATHER AND TEMPERATURE SIGNALS.

An effort has been made to organize a system of flag stations throughout the State, but so far has met with very little success. This may be attributed to the fact that negotiations for their establishment have been conducted by correspondence instead of personal solicitation.

CROP WEATHER BULLETINS.

Bulletins showing crop conditions and prospects throughout the State have been issued, commencing May 26, 1888, copies of which have been furnished to all crop correspondents, State observers, agricultural societies, and the press of the State. These bulletins have become a valuable factor in the dissemination of crop statistics among the communities to which they are sent. They have been well received and eulogized by the different agricultural societies, and have been favorably commented upon by the journalists of New Jersey. It may be added in this connection that the issuance of these bulletins has been largely instrumental in bringing the service prominently before the public.

In order to increase the efficiency of the service by the establishment of stations in each county of the State fully equipped with standard instruments, a bill (the text of which is given below) was draughted and presented to the legislature, entitled "An act to establish a meteorological bureau for the State of New Jersey" This bill passed both house and senate unanimously, but for some reason failed to secure the signature of the governor. A similar bill will be presented at the next session of the assembly, and there are strong reasons to believe that the next annual report from this station will contain not only a record of its passage, but also of its acceptance and signature by the chief executive of the State, as well as that the appropriations and provisions therein provided for have been complied with.

In conclusion, it is greatly to be regretted that during the year visits to the different stations for the purpose of becoming acquainted with the observers and the situations and exposures of their instruments have been impracticable on account of the expense which would be entailed. To obviate this difficulty an effort is now made to secure an annual pass over the different railroads of the State, which would admit of these visits, so essential to the harmonious working of the system being made.

Very respectfully, your obedient servant,

E. W. McGANN,
Sergeant, Signal Corps, Assistant.

The CHIEF SIGNAL OFFICER,
Washington, D. C.

The following is the text of the bill creating a meteorological bureau in this State, which was introduced February 20 by Hon. Charles B. Herbert, of New Brunswick, and passed both houses on March 29, 1888:

AN ACT to establish a meteorological bureau for the State of New Jersey.

1. *Be it enacted by the senate and general assembly of the State of New Jersey,* That there be, and hereby is, established at the State Agricultural College, New Brunswick, New Jersey, a central office for meteorological observation, with Professor George H. Cook, of

said college, the secretary of the State board of agriculture, and a third person, to be appointed by the governor, as a board of directors; the members of the board shall be commissioned by the governor, and be duly qualified as like officers of the State.

2. *And be it enacted*, That Professor George H. Cook, of said college, is hereby appointed president of the board, and by and with the advice of the directors shall establish, if practicable, one volunteer weather station in each county and supervise the same; he shall receive reports therefrom and reduce the same to tabular form, and report the same monthly for publication as the New Jersey weather report, and shall annually make a report to the governor, which shall contain a detailed statement of all expenditures made during the year, and a summary of the observations made at the various stations.

3. *And be it enacted*, That the president of the board be directed to print, under contract, one thousand copies of each monthly report, which shall be distributed by said board.

4. *And be it enacted*, That there is hereby appropriated for the ensuing year, for the establishment of said bureau and stations, the sum of one thousand dollars, or so much thereof as may be necessary for the purpose of meeting actual expenses of carrying out the provisions of this act; no part of said sum shall be paid for salaries of any officer or for office rent.

5. *And be it enacted*, That no money shall be expended except under the order of the president director, by and with the approval of the board.

6. *And be it enacted*, That this act shall take effect from and after its passage.

State agricultural college crop report, Bulletin No. 8, *July* 14.

NEW BRUNSWICK, N. J., *July* 14, 1888.

The crop correspondents and observers of the New Jersey State weather service have made the following reports for the week ending July 14, 1888, concerning the weather and the condition of the growing crops:

Temperature.—During the past seven days the temperature has been about the seasonal average in all the counties of the State except Union, Essex, Middlesex, Hunterdon, and Somerset, where it was below. In these counties the cool, damp nights have somewhat retarded the growth of potatoes, corn, and vegetables.

Precipitation.—The rainfall during the past seven days has been slightly above the average in all the counties except Morris and Essex, where the ground is too dry for the transplanting of vegetables.

SUMMARY OF REPORTS.

Hanover.—The light showers on four days did not interfere with haying and harvesting. Corn and potatoes are doing well.—M. M. Cook.

Mount Holly.—Cut grain is in danger from too much rain. Soil plenty wet for corn and potatoes.—H. I. Budd.

South Orange.—Hay crop large and in good order. Ground too dry for transplanting of celery and cabbage.—W. J. Chandler.

Locktown.—Rain has somewhat retarded harvesting; the greater portion in shock. Wheat has never been a better crop. Hay housed in fair condition.—George W. Hockenbury.

Freehold.—Grain harvest has commenced. Wheat will be a full average; rye never so large. Recent rains have benefited small fruits.—Miss A. S. Yard.

Bridgeton.—Crops of all kinds looking well. All wheat gathered. Raspberries and blackberries very fair.—H. A. Jordan.

Readington.—Harvesting progressing favorably; grapes rotting; apple trees infested with caterpillars. Rain has been beneficial to oats.—John Fleming.

Somerville.—The cool nights seem to have retarded potatoes, corn, and vegetables. Berries are two weeks later than last year, and in greater abundance.—A. C. Lindsley.

Beverly.—Crops are looking well.—C. F. Richardson.

Moorestown.—Heat and moisture have caused potatoes to sprout and set anew. Rain, cloud, and fog have retarded harvesting. Wheat and rye mostly in shock; find a few sprouting grains; rain on 12th likely to be most serious of any if not followed by bright, breezy days. Much timothy to cut yet; is in good condition. Corn growing very fast.—I. J. Beans.

Egg Harbor City.—Corn, sweet potatoes, and garden crops looking well. Grapes, Concords, one-third crop; Clinton and Saint Anna badly rotting; will be about half crop. Blackberries very good.—H. Y. Postma.

Clayton.—Harvesting about done, and gathered in good condition.—W. T. Wilson.

Rancocas.—The rains during the week have retarded harvesting. Some wheat in shock reported sprouting. Oats are turning, and promise a good yield.—Spencer Haines.

College Farm.—Wheat stacked in fair order; haying finished; a good crop. Corn somewhat injured by hail, but will recover. Potatoes promising; oats fair.—A. B. Sears.

Union.—Growth slightly retarded by cool rains; favorable for transplanting cabbage; acreage set above average; fruit generally scarce.—F. L. Dunbar.

Oceanic.—The rains during the week were particularly beneficial to grass and corn. The gathering of hay and grain retarded, but not injuriously. All garden crops looking well. Raspberries not abundant.—John E. Parmly.

Ocean City.—The rainfall for last seven days is below average, and has affected the truck crop very injuriously.—W. Lake.

E. W. McGann,
Sergeant, Signal Corps, Assistant.

Referring to the weather crop bulletin of the New Jersey weather service, of which the above is a sample, the New Brunswick Home of July 16, 1888, contained the following:

"The weekly weather crop bulletin, which is issued by the New Jersey state weather service, is meeting with great favor. Farmers of various districts are urging its publication in papers of their neighborhood and scarcely a day passes in which Mr. E. W. McGann, the efficient manager of the service in this city, does not receive highly commendatory epistles as to the value of the bulletin to farmers. The report is made up from bulletins which are sent in every week by the voluntary observers throughout the State, and contains in a terse form the rainfall, temperature, sunshine, with conditions of the crops for the week. The bulletin is not only of great value to agricultural districts, but it prevents in a measure the 'corners' which speculators in grain and breadstuffs like so much to bring about when sunshine and rain seem to be in their favor. A weather service in every State and Territory, such as New Jersey boasts of to-day, would soon deal speedy blows to all scheming grain speculators in the land."

[Inclosure XVI.]

NORTH CAROLINA STATE WEATHER SERVICE.

Annual report of the North Carolina State weather service for 1887.

The State weather service, organized in December, 1886, is now an accomplished fact. It has already accumulated much valuable meteorological data, which will be of permanent service to the State. In its weather indications, cold-wave and frost warnings it has distributed broadcast throughout the State information of great value to the farming population as well as all classes of her people.

A State weather service has a twofold duty: (1) The collection of accurate detailed weather statistics for the territory of a State; and (2) the dissemination of practical information, weather "indications," and frost or cold-wave warnings.

The profession of farming is more interested in the weather than any other, and forecasts of the weather for twenty-four or forty-eight hours ahead will determine the commonest every-day operations on the farm.

Besides these ordinary benefits, which everybody will appreciate, North Carolina has unusually large interests in crops which frosts and freezes can destroy, and which may be saved if only half a day's warning of cold is given. Our tobacco, truck, and fruit interests have been frequently damaged to the extent of from one-fourth to one-half of the whole by sudden frosts and freezes, of which our farmers had no warnings.

Some of the immediate benefits of the State weather service may only be briefly touched upon here:

(1) It will bring the benefits of the weather "indications," "cold-wave" warnings, etc., of the United States Signal Office to bear directly upon the interests and daily lives of a great many of our people, and secure for them whatever benefits there may be in them.

(2) The weather service will be the means of securing a much better knowledge of the meteorology of our State, which will be valuable in more ways than can be named here.

(3) It will give the people of all parts of the State reliable standards for temperature, rainfall, humidity, wind velocity, etc., which are sources of varied useful information.

(4) It will put within the reach of local agricultural clubs and individual farmers the means of accurate observations upon the relations of the weather to our crops. Without a weather record in figures our conceptions of what the weather was during any particular season are sure to be very unreliable.

(5) It will educate the people at large on the subjects in science which have the most important bearing upon their interests, comfort, and lives.

The State weather service, as established and now in operation, is an organization of the voluntary observers and signalmen throughout the State of North Carolina, co-operating with the United States Signal Service and this experiment station. The Signal Service stations an experienced observer at the central office, who acts as assistant to the director of the State service in keeping the records of the meteorological data, in preparing summaries of the state of the weather, in distributing to the signal stations the various weather indications.

Heretofore the central station has been located at the experiment farm, 1½ miles from the city, but on account of the obvious difficulty in keeping the records at a point so distant from the office of the director the station was removed to the city, where it now occupies a commodious office in the Agricultural Building. Here the records are kept, and all the work of compiling the data received from the various observers goes on. Connected with the office, too, is a complete observing station, ranking first class in all of its appointments. Self-recording instruments, maximum and minimum thermometers, anemometer, wet and dry bulb thermometer are conveniently located on the summit of the roof. Two standard barometers are in use in the office, and a standard rain-gauge is located in rear of the building at the surface of the ground. On the roof is a 36-foot flag-staff, upon which are displayed daily signal flags giving the weather indications. Tri-daily observations are taken, at 7 a. m., 3 p. m., and 10 p. m., which are transmitted by telegraphic cipher to Washington, where they are used in the preparation of a daily weather map of the United States and for other meteorological purposes.

The central weather station in the past year has been able to procure from United States Signal Service in Washington daily telegraphic dispatches, giving the state of the weather, barometer reading, temperature, rainfall, etc., of thirty different stations scattered throughout the United States, which are published in the daily city papers, and posted in several public places for the convenience of the people generally. These telegrams are used by the business men of the city and by the Cotton and Grocers' Exchange; at this latter building a large United States map is displayed, on which are posted daily colored symbols, showing the change of the weather at the various localities throughout the country. By this means the people of the city and the surrounding country can get reliable and valuable statistics showing the state of the weather elsewhere, which will prove of great benefit to them in their several lines of business.

The daily weather indications and "cold-wave" warnings sent out from the Signal Office at Washington are distributed to numerous signal stations in North Carolina. These reports are posted on bulletin boards or displayed by flags on considerable elevations, so that the signals may the better be distributed to the people generally.

The distribution of the telegrams of the weather indications was interrupted in April, 1887, owing to a decreased appropriation from the United States to the Signal Service, but was resumed on July 1 on a much more substantial basis. Under the reorganization, the number of stations displaying signal flags will be largely increased, so that a greater number of the people of the State can reap the advantage to be derived from them.

Stations where flags or bulletins are used to circulate widely the weather indications and warnings are termed signal stations. They now number 54, are scattered throughout the State, and are located in nearly every portion reached by telegraphic lines.

List of signal stations.

Name of station.	Name of county.	Displayed by—
Asheville	Buncombe	Battery Park Observatory.
Battleborough	Nash	A. J. Hobgood.
Burlington	Alamance	J. A. Turrentine.
Cameron	Moore	K. M. Ferguson.
Chapel Hill	Orange	R. E. Carr.
Cronly	Columbus	A. T. Wishart.
Durham	Durham	H. H. Snow.
Fayetteville	Cumberland	Rose & Leak.
Faison	Duplin	J. S. Westbrook.
Gibson Station	Richmond	W. H. Morrison.
Greensborough	Guilford	J. H. Hampton.
Gastonia	Gaston	J. T. Bingham.
Goldsborough	Wayne	Argus Publishing Company.
Henderson	Vance	J. L. Currin.
Hickory	Catawba	O. M. Royster.
High Point	Guilford	Chief of Police Hoffman.
Hot Springs	Madison	C. F. McGahan.
Jonesborough	Moore	M. C. McIver.
King's Mountain	Cleveland	C. M. Nolan.
Kinston	Lenoir	R. F. Whitehurst.
Louisburgh	Franklin	O. L. Ellis.
Leaksville	Rockingham	B. F. Ivey.
Lenoir	Caldwell	J. M. Bernhardt.
Lincolnton	Lincoln	Jenkins Bros.
Magnolia	Duplin	H. J. Hope.
Marion	McDowell	W. F. Craig.
Maxton	Robeson	S. W. Parkham.
Monroe	Union	T. M. Brown.
Mooresville	Iredell	A. Leazer.
New Berne	Craven	President Washington Bryan.
Newton	Catawba	E. P. Schrum.
Oxford	Granville	W. H. White.
Pineville	Mecklenburgh	W. T. Young.
Pittsborough	Chatham	W. R. Hunter.
Raleigh: *		
Agricultural Building	Wake	H. McP. Baldwin.
City Hall	do	Police Department.
Shaw University	do	Dr. H. M. Tupper.
Reidsville	Rockingham	George R. Quincy.
Rockingham	Richmond	W. E. Shortridge.
Rocky Mount	Edgecombe	S. K. Fountain.
Salisbury	Rowan	John H. Hedrick.
Shelby	Cleveland	J. E. Martin.
Smithfield	Johnston	J. Morris.
Statesville	Iredell	D. M. Conn.
Tarborough	Edgecombe	W. E. Fountain.
Toisnot	Wilson	C. F. Black.
Thomasville	Davidson	J. A. Elliott.
Warrenton	Warren	Arrington Bros.
Wake Forest	Wake	Prof. W. G. Simmons.
Warsaw	Duplin	J. W. Morrison.
Weldon	Halifax	H. S. Cooper.
Whitaker's	Edgecombe	J. C. Basswell.
Winston	Forsyth	Brown & Brown.
Walnut Cove	Stokes	J. A. Burton.

* Central station.

The important work of collecting meteorological statistics is carried on by the voluntary assistance of observers scattered pretty well throughout the State from east to west, with the additional information obtained from the reports of regular signal service observers located in this and the adjacent territory of other States.

The State weather service is entirely a voluntary organization, without any funds for the purchase of meteorological instruments. We find it very difficult, therefore, to extend the number of observing stations to include mountainous and other sections of the State where it would be desirable to have observations. Various friends and communities have assisted the service in the past by equipping many of the observing stations already established. But the State service is greatly in need either of funds or of instruments with which to supply newly created observing stations.

Negotiations are now pending with the United States Signal Service whereby it is hoped that a supply of instruments can be procured on favorable terms, and the number of stations thus largely increased.

The full set of instruments for voluntary observers consists of maximum registering thermometer, minimum registering thermometer, dry-bulb thermometer, wet-bulb thermometer, and rain-gauge with overflow and measuring-stick. All the new instruments

are of H. J. Green's best make, and were corrected at Washington. In addition, some of the stations are supplied with standard barometers.

Observing stations.

Station.	County.	Observer.
Asheville	Buncombe	Asa S. Loomis.
Chapel Hill	Orange	Prof. J. W. Gore.
Charlotte	Mecklenburgh	*James A. Barry.
Cape Henry, Va	Princess Anne	*William Davis.
Chattanooga, Tenn	Hamilton	*L. M. Pindell.
Davidson College	Mecklenburgh	Prof. H. L. Smith.
Goldsborough	Wayne	John R. McMachen.
Hatteras	Dare	*George H. Penrod.
Henderson	Vance	J. L. Curren.
Hot Springs	Madison	Dr. C. F. McGahan.
Kitty Hawk	Currituck	*P. H. Fitzmaurice.
Knoxville, Tenn	Knox	*Charles F. Dickens.
Lenoir	Caldwell	Dr. R. L. Beall.
Lynchburgh, Va	Campbell	*W. H. Fallon.
Marion	McDowell	W. F. Craig.
Maxton	Robeson	Dr. J. D. Croom.
Monroe	Union	D. C. Anderson.
Mount Pleasant	Cabarrus	Prof. H. T. J. Ludwig.
New Berne	Craven	William Dunn.
Norfolk, Va	Norfolk	*James P. Sherry.
Oxford	Granville	W. C. Biggs.
Raleigh†	Wake	*H. McP. Baldwin.
Reidsville	Rockingham	Prof. T. J. Norcom.
Salisbury	Rowan	John A. Hedrick.
Salem	Forsyth	Rev. John Clewell.
Southport	Brunswick	*E. E. Perry.
Tarborough	Edgecombe	E. V. Zoeller.
Wake Forest	Wake	Prof. W. G. Simmons.
Waynesville	Waywood	W. W. Stringfield.
Weldon	Halifax	T. A. Clark.
Wilmington	New Hanover	*F. P. Chaffee.

*Signal Service observers. † Central station.

Monthly summaries of the above stations have been published in the bulletin of the Department of Agriculture during the past year. These reports will be continued monthly; and it is hoped, with the increase number of observing stations, that they will be of largely increased value.

The meteorological conditions tabulated in the weather review of the North Carolina weather service relate chiefly to the climatic changes in the State of North Carolina and its adjacent territory in the States of Virginia and Tennessee.

H. B. BATTLE, Ph. D.,
Director.

H. McP. BALDWIN,
Sergeant, Signal Corps, Assistant.

Sixteenth weekly weather crop bulletin of the North Carolina weather service, for the week ending Saturday, September 15, 1888:

[Co-operating with the United States Signal Service.]

RAINFALL.

The rainfall in all the districts was largely in excess of the normal weekly rainfall for the month of September in this State. Crops generally, and cotton especially, have been injuriously affected. The following rainfalls, as compared with the normal, will show the amount of excess:

Eastern District.—Halifax, Halifax County, 3.50 inches; Hertford, Perquimans County, 3.50 inches; Rocky Mount, Nash County, 9.00 inches; Rocky Point, Pender County, 3.30 inches; Scotland Neck, Halifax County, 3.00 inches; Tarborough, Edgecombe County, 2.79 inches; Weldon, Halifax County, 2.03 inches; Warsaw, Duplin County, 2.03 inches; average for the district, 3.64 inches.

Central District.—Greensborough, Guilford County, 5.20 inches; Gibson's Station, Richmond County, 3.00 inches; Hillsborough, Orange County, 3.00 inches; Monroe, Union

County, 3.42 inches; Walnut Cove, Stokes County, 5.30 inches; Raleigh, Wake County, 3.35 inches; average for the district, 3.88 inches.

Western District.—Mount Pleasant, Cabarrus County, 4.68 inches; Mount Airy, Surry County, 7.00 inches; Davidson College, Mecklenburgh County, 10.00 inches (nearly); Bat Cave, Henderson County, 2.70 inches; average for the district, 6.10 inches; average for the State, 4.54 inches; excess, 3.46 inches.

TEMPERATURE AND SUNSHINE.

There was an average temperature and a deficiency of sunshine. The effect upon crops was injurious.

REMARKS OF SPECIAL CORRESPONDENTS.

EASTERN DISTRICT.—*Elizabeth City, Pasquotank County:* The weather has been unfavorable for saving fodder. Corn has been injured by the excessive rain. *Halifax, Halifax County:* Rains past week have badly damaged all crops. All corn on the Roanoke low grounds ruined by freshet, which is the highest since 1877. *Hertford, Perquimans County:* Continued rains caused cotton to take rust. Rice has come out very much since the rain. *Kinston, Lenoir County:* Cotton crop badly damaged by rottening. *New Berne Craven County:* Cotton and corn have doubtless suffered from excessive rain. *Rocky Mount, Nash County:* All crops have been seriously injured by heavy rains. *Rocky Point, Pender County:* Cotton continues to rust and shed. *Scotland Neck, Halifax County:* Crops of all kinds seriously damaged. *Tarborough, Edgecombe County:* Lowland crops have been injured by the freshet. Cotton has, to some extent, the rot and black rust. *Toisnot, Wilson County:* Rain has caused cotton to sprout and rot in the boll. Cotton will undoubtedly come in short. *Warsaw, Duplin County:* Crops, cotton especially, have been much injured by the excessive rains. *Weldon, Halifax County:* Roanoke River is higher than at any time, except the flood of 1877. All low-ground crops destroyed. *Williamston, Martin County:* Have had plenty of rain. Fodder injured and has damaged the cotton crop very much. *Warrenton, Warren County:* Cotton somewhat injured by rains. Corn poor; pea crop doing well.

CENTRAL DISTRICT.—*Durham, Durham County:* Much damage is reported from the heavy rains of the past week. Farmers were stopped in the curing of their tobacco by the rains, and now they say it is growing green again and can not ripen before frost. *Haw River, Alamance County:* Haw River is higher than ever known. Bridges all gone. Corn and tobacco injured, and it feared bottom corn ruined. *Oxford, Granville County:* The heavy rains for the past two weeks have caused tobacco to take a second growth, and thus retarded its curing. *Raleigh, Wake County:* All crops have suffered from the long wet spell. *Salem, Forsyth County:* The heavy rains and wind have done much damage to all crops. Corn on bottom land almost ruined. *Smithfield, Johnson County:* Cotton and peas badly damaged. *Walnut Cove, Stokes County:* The rains for the past week have flooded all lowland crops.

WESTERN DISTRICT.—*Mount Airy, Surry County:* Cotton and tobacco damaged by heavy rains. *Mount Pleasant, Cabarrus County:* Freshet damaged corn and grass along creeks.

H. B. BATTLE, Ph. D.,
Director.

H. McP. BALDWIN,
Sergeant, Signal Corps, Assistant.

CENTRAL OFFICE, AGRICULTURAL BUILDING,
Raleigh, N. C.

[Inclosure XVII.]

OHIO METEOROLOGICAL BUREAU.

[Benj. F. Thomas, director; Lieut. Charles E. Kilbourne, U. S. A., secretary; C. M. Strong, private, Signal Corps, assistant.]

CENTRAL STATION, OHIO STATE UNIVERSITY,
Columbus, Ohio, August 24, 1888.

SIR: In compliance with your request of the 20th instant, I have the honor to make the following report of the work of the Ohio meteorological bureau for the year ending June 30, 1888:

The corps of observers reporting June 30 numbered forty-six, of whom five were observers of the United States Signal Service and thirty-five of the Ohio meteorological

bureau, six of the latter being rainfall observers. New stations were established during the year at Celina, Prof. W. F. McDaniel, observer; at Akron, Prof. C. S. Howe, observer, and at Athens, Prof. A. D. Morrill, observer; and the stations at Findlay, Gambier, Warren, College Hill, and Napoleon discontinued.

During the year nearly all the stations of the bureau were inspected, and when necessary instruments were cleaned and repaired and instructions given to observers. As one of the results of the inspection thermometer shelters of the most approved pattern will be sent to a number of stations at which the instruments were not properly exposed.

Since the month of November, 1887, a monthly bulletin has been issued in addition to the regular monthly report. The bulletin contains a summary of the weather for the preceding month, and is sent to all observers and to all the leading papers throughout the State. It is the intention of the bureau to issue next year a "weekly crop report," providing the necessary appropriation can be obtained to cover the expense of the undertaking.

It has been thought desirable to make the meteorological portion of the annual reports of the bureau cover the period from January 1 to December 31, in order that our results may be readily compared and combined with those of the Signal Service and of other meteorological organizations. The change was made in the last annual report.

As a rule the observers have discharged their duties most faithfully and efficiently, and have warmly seconded the efforts of the officers of the bureau to improve the accuracy of observations and reports, and to secure the early appearance of reports each month.

Mr. E. H. Mark, who filled the position of secretary of the bureau so ably, resigned to accept the chair of physics at the Louisville high school, Louisville, Ky, in August.

Mr. Charles M. Strong was detailed by the Chief Signal Officer, General A. W. Greely, in July, to aid the bureau in its work. After Mr. Mark's departure the entire work of the office was performed by Mr. Strong until November, when Lieut. Charles E. Kilbourne, detailed as professor of military science at the university, was elected secretary. Mr. Strong's detail continues. A list of stations reporting June 30, 1888, is inclosed (A). The list gives the number and location of each station, date of establishment, latitude, longitude, elevation, and the name of the present observer.

The distributions of signals on baggage-cars on the the three sections of the Columbus, Hocking Valley and Toledo Railroad, on the Columbus and Cincinnati Midland Railroad, and on the Cleveland, Mount Vernon and Delaware Railroad was continued until March 15, when the failure of the deficiency bill in Congress compelled the Chief Signal Officer to stop the telegraphing of predictions. The system of signals used to indicate the predicted weather was changed by the Signal Service, and the display by cars was not taken up again when the telegraphing of predictions was resumed, the railroads not being willing to make the necessary alterations in the signals at their own expense, and the bureau having no means for that purpose. On resuming the telegraphing of predictions in July, the Chief Signal Officer offered to send telegrams daily to a limited number of points in Ohio, to be named by the bureau. The telegrams were to be sent at Government expense, the only condition required being the regular display of predictions by flags, and a report each month, as to time of receipt and display of predictions, and as to verifications of predictions. A list of places receiving the indications is inclosed (B).

This service is giving great satisfaction. The bureau is under great obligation to the Chief Signal Officer, General A. W. Greely, for courtesies and substantial assistance in many ways. He has shown great interest in our work, and has contributed greatly to its success.

During the year a number of applications were made for the establishment of new stations, which were for the present declined, because of lack of funds for the purchase of new instruments, and because the work necessary to prepare properly the returns from existing stations was as great as the office could do. It would be well to establish a station at each county seat, but this can not be done with the sum now annually appropriated.

I have the honor to be, very respectfully, yours,

BENJ. F. THOMAS,
Director, Ohio Meteorological Bureau.

The CHIEF SIGNAL OFFICER,
Washington, D. C.

A.—*List of stations reporting to the Ohio Meteorological Bureau, with latitude, longitude, elevation, time of establishment, equipment, and name of observers, June* 30, 1888.

No.	Stations.	Latitude.		Longitude.		Elevation.	Date of establishment.	Name of observer.
		°	′	°	′	Feet.		
1	Cincinnati	39	06	84	26	628		Sergt. P. T. Jenkins.
10 *a*	Toledo	41	40	83	34	651		Sergt. J. W. Byran.
10 *b*	Sandusky	41	25	82	40	638		Sergt. B. F. Hough.
13 *a*	Columbus	39	58	83	00	812		Sergt. Orin Parker.
21 *a*	Cleveland	41	30	81	27	690		Sergt. W. H. Hammon.
3	Dayton	39	44	84	09	790	Oct., 1882	Mr. E. L. Boyer.
4 *a*	New Bremen	40	31	84	23	981	do	Prof. C. W. Williamson.
4 *b*	Sidney	40	15	84	07	960	Dec., 1882	Ed. Pence.
4 *c*	Greenville	40	07	84	50	1,060	Dec., 1885	Charles G. Katzenberger.
4 *d*	Celina	40	35	84	35	890	June, 1887	Prof. W. F. McDaniel.
5 *a*	Upper Sandusky	40	44	83	16	880	Oct., 1882	Dr. A. Billhardt.
6 *a*	Wauseon	41	36	84	07	800	do	Thomas Mikesell.
6 *b*	Paulding	41	09	84	36	734	Nov., 1883	L. E. Hitchcock.
7 *a*	Clarksville	39	25	84	12	1,010	Sept., 1886	E. T. M. Williams.
7 *b*	Yellow Springs	39	47	83	51	1,017	June, 1885	Charles W. Rice.
8	North Lewisburgh	40	13	83	34	1,030	Oct., 1882	H. D. Gowey.
9 *a*	Bangorville	40	36	82	30		do	S. M. Painter.
11 *a*	Hanging Rock	38	32	82	38	551	do	James Bull.
11 *b*	Portsmouth	38	44	83	00	527	Sept., 1882	D. B. Cotton, M. D.
12 *a*	Washington C. H.	39	31	83	34	975	Dec., 1882	J. D. Post, attorney.
12 *b*	Waverly	39	10	82	57	612	do	H. W. Overman, C. E.
12 *c*	Georgetown	38	52	83	47	940	Dec., 1885	Dr. T. W. Gordon.
13 *b*	Ohio State University	40	00	83	01	757	Oct., 1882	M. Craig.
13 *c*	Westerville	40	08	83	00	850	Dec., 1882	Prof. J. Haywood.
13 *d*	Logan	39	35	82	19	730	Sept., 1883	Dr. J. Little.
14	Oberlin	41	19	82	13	855	Oct., 1882	Prof. F. F. Jewett.
15 *a*	Marietta	39	25	81	28	640	do	Prof T. D. Biscoe.
15 *b*	McConnellsville	39	50	81	40	704	Mar., 1884	C. H. Morris.
15 *c*	Pomeroy	38	18	81	50	590	Apr., 1884	Dr. D. N. Allard.
15 *d*	Athens	39	20	82	02	745		Prof. A. D. Morrill.
16 *b*	Newcomerstown	40	23	81	33	798	Feb., 1886	Dr. A. M. Beers.
17 *a*	Quaker City	39	38	81	16	1,180	Oct., 1882	W. K. Cowden.
17 *b*	New Alexandria	40	15	80	45	1,050	Jan., 1885	Joseph A. Hook.
18 *a*	Canton	40	49	81	23	1,070	Oct., 1882	Prof. C. F. Stokey.
18 *b*	Youngstown	41	06	80	39	855	June, 1885	A. G. Frost.
19 *a*	Hiram	41	19	81	09	1,260	Nov., 1884	Prof. George N. Colton.
19 *b*	Jefferson	41	44	80	45	934	Jan., 1884	Judge E. C. Wade.
20	Wooster	40	49	81	54	1,063	Apr., 1883	Dr. O. N. Stoddard.
21 *b*	Cleveland	41	30	81	27	656	do	G. A. Hyde.
22	Akron	41	05	81	20	1,080	Feb., 1887	Prof. C. S. Howe.
	Weymouth							Dr. F. Young.
	Springborough							Miss Ruth Ellis.
	Hudson							D. W. Meyers.
	Waynesville							E. B. Michener.
	Ellsworth							D. A. Allen.
	Jacksonburgh							Dr. J. B. Owsley.

NOTE.—Of the above five are regular Signal-Service stations; of the remaining, State weather stations, thirty-three are supplied with barometer, maximum and minimum thermometers, hygrometer, wind-vane, rain-gauge; two with maximum and minimum thermometers, hygrometer, wind-vane, rain-gauge; and five have rain-gauges only.

B.—*List of places receiving indications.*

Observers.	Stations.	Observers.	Stations.
Dr. D. N. Allard	Pomeroy, Ohio.	C. H. Morris	McConnellsville, Ohio.
A. G. Frost	Youngstown, Ohio.	Charles S. Hunt	Warren, Ohio.
W. J. Abbe	Dayton, Ohio.	Postmaster	Wooster, Ohio.
Law, Schlenck & Co	Oxford, Ohio.	W. E. Bryan	Gallipolis, Ohio.
Hon. H. Hutchinson	Huntington, W. Va.	Chief fire department	Mansfield, Ohio.
J. W. Watkins	Delaware, Ohio.	Charles W. Goodspeed	Elyria, Ohio.
T. W. Connolly	Manchester, Ohio.	F. J. Klein	Bryan, Ohio.
Ed. Pence	Sidney, Ohio.	Dr. O. W. Ward	Duncan's Falls, Ohio.
J. C. Mills & Son	Kenton, Ohio.	Robert Bicker	Newcomerstown, Ohio.
Watson & Co	Lima, Ohio.	P. W. Eigner	Kent, Ohio.
M. M. Murphy	Ripley, Ohio.	A. J. Frame	Athens, Ohio.
Rock Hughes & Co	Urbana, Ohio.	Aug. Franke	Wapakoneta, Ohio.
J. A. Hiveling	Xenia, Ohio.	W. A. Gamble	Lakeside, Ohio.
J. W. Marvin	Galion, Ohio.	E. M. Wolf	Bellevue, Ohio.
Charles Hays	Fostoria, Ohio.		

[Inclosure XVIII.]

OREGON STATE WEATHER SERVICE.

SIGNAL SERVICE, OFFICE OF THE OBSERVER,
Roseburgh, Oregon, July 6, 1888.

SIR: I have the honor to submit herewith a report of the Oregon weather service, as directed in your communication of June 7, 1888.

Very respectfully, your obedient servant,

B. S. PAGUE,
Sergeant, Signal Corps.

The CHIEF SIGNAL OFFICER,
Washington City.

OREGON STATE WEATHER SERVICE,
Roseburgh, Oregon, July 1, 1888.

SIR: At the session of the Oregon legislature in January, 1887, a bill to establish a weather service was presented. No action was taken upon it, however, owing to the late hour at which it was handed in, although it met with much favor.

I then made arrangements by which reports would be collected monthly and published in the Portland (Oregon) Journal of Commerce. The first report was for March, 1887, and appeared in print April 16, 1887. Eleven stations reported. Data of the temperature, precipitation, weather, and prevailing direction of wind were published.

My efforts were seconded by the voluntary observers of the State, and new stations were added; so that at the present time there are twenty stations reporting, and more could be obtained if instruments should be furnished.

The report of the service was published in the Journal of Commerce until May, 1888, when it was found that the needs of the service required a monthly paper especially devoted to this work. Mr. A. C. A. Perks, editor of the Portland Journal of Commerce, offered to furnish 6,000 copies of the paper free of charge. The Portland board of trade and board of immigration were anxious for the paper; so arrangements were made by which the Oregon State Weather Review and Agricultural Report was published under the auspices of the boards mentioned.

I prepare all the matter, statistical and otherwise, and Mr. Perks manages and publishes the paper in Portland.

To show how the paper has been received by the press of the State I quote from the Walla Walla Journal, the Pacific Farmer, Oregon City Courier, and Capital Journal.

Walla Walla Journal said: "It contains a strong showing of the climatic advantage of Oregon and Washington Territory, whose publication will be certain to be a powerful factor in the settlement of the country." The Pacific Farmer said: "This is a good thing and should be supported." The Oregon City Courier said: "From it intending settlers will be able to gather reliable information regarding the climate." The Salem Capital Journal said: "The data contained therein will certainly prove valuable information to people wishing to learn of the climate of the State."

Many other complimentary notices might be given.

Many of the principal papers of the State quote from its columns and speak of the work it is doing.

It is hoped to establish new stations and thus extend the work of the paper.

A desire was manifested by some of the citizens of Oregon to have the weather indications telegraphed daily to various parts of the State. The necessary arrangements were made, and since January they have been telegraphed from San Francisco at 2 p. m. daily, to Roseburgh, Eugene City, and Salem. The press dispatches give the indications for Portland; hence they are not telegraphed there. The indications have been most favorably commented upon, but owing to the equable climate of Oregon they are not so beneficial as they would be in a more changeable and rigorous climate.

I find that the service can be made of more practical use to the people generally by publishing climatic data and descriptive matter setting forth the actual climatic conditions, and then by comparing them with those of Eastern States. For that reason I give in the Oregon Weather Review the table and bulletin of the previous month's weather, and fill up the remaining space with climatic notes.

This is what the people want. Oregon being so far off from the center of population, its climate is unknown and misrepresented, and this paper was started to clearly and truthfully show what Oregon is, and also to assist immigration on real facts.

Then, too, the paper had for its object the better illustrating to the people the benefits of a State weather service to them, and in this manner to assist the passage of the neces-

sary laws by the next legislature in January, 1889, by which the "Oregon State weather service" will be legally established.

The object and aim of the weather service is to benefit the State by publishing actual statistics (weather and crop), for they will equal and in many cases exceed those of other States.

I would recommend that about ten sets of instruments, thermometers and rain-gauges, be furnished by the United States Government to this service. By so doing the reports will cover a larger area of country and will more particularly describe the remote portions of the State. The various parts of the State should be visited and the people solicited to co-operate with me. Much good would be accomplished thereby.

An assistant should be furnished me, for although I am able to accomplish all the necessary work of this undertaking and to properly perform the duties appertaining to my office, yet there are many things in connection with the weather service which could be extended and more ably performed if I had more time, and which would assist greatly in the establishment of the service.

Personal influence, I find, goes a great way in the pushing of any measure here, and if I could be enabled to visit the reporting stations here and establish new ones, by the aid of an assistant at Roseburgh, the State service would be greatly benefited. The railroads will furnish free of charge all necessary transportation in the State for this work.

It is hoped to soon have agents along the line of the Oregon branch of the Southern Pacific Railroad Company taking observations and reporting. The Oregon Short Line did start in to do so, but owing to a curtailment of their expenses this new feature was dropped.

It is confidently expected that at the next session of the Oregon legislature, in 1889, the necessary laws to establish a State service will be enacted.

Oregon is fast settling, and great interest is being manifested in fruit culture, the State being peculiarly adapted to many fruits that can not be raised in the East, and now this interest is developing, and it is hoped to render aid to this and all new industries by climatic data, weather indications, and by other means.

To increase the value of the service to the people of Oregon instruments should be furnished and an assistant sent to the person conducting the service.

It is a gratification to me to see the Oregon Weather Review issued, and to feel that progress and advancement have been made the past year in the prosperity of the service.

Oregon is a large and new field to work in, being settled by the best of people, intelligent and cultivated, and I am sure that no State can, by proper assistance, show better results than it when the service is on a legal basis.

B. S. PAGUE,
Sergeant, Signal Corps, in charge Oregon weather service.

The CHIEF SIGNAL OFFICER, U. S. A.,
Washington, D. C.

The accompanying extract is from "The Resources of the State of Oregon," prepared under direction of the State board of agriculture, published in 1888, and relates to an article on the climate of Oregon by Sergeant Pague, Signal Corps, in charge of the State weather service:

"Especial attention is asked to the comprehensive and valuable report on the Oregon climate, by Mr. B. S. Pague, of the United States Signal Service, Roseburgh, and acknowledge on behalf of the board of agriculture our obligations to him and to each of the gentlemen who contributed to that report. We earnestly indorse the recommendations of Mr. Pague regarding the establishment of a weather service bureau by the State, and urgently recommend, in addition thereto, the importance of creating at the earliest possible opportunity a system of crop reports and a bureau for obtaining reliable statistics concerning every department of our industries. These are matters which should be provided, not especially to encourage immigration, but that our own people may know more about the different and distant parts of the State. By comparison people improve in all lines of business and in all classes of enterprise. Such a system would afford our citizens an opportunity to make comparisons."

[Inclosure XIX.]

PENNSYLVANIA STATE WEATHER SERVICE.

FRANKLIN INSTITUTE. OFFICE OF THE SECRETARY,
Philadelphia, August 2, 1888.

SIR: Sergeant Townsend has submitted to my inspection a draught of his report of July 31, 1888, addressed to the Chief Signal Officer, which fairly represents the facts and appears to be entirely satisfactory.

Your obedient servant,

WM. H. WAHL,
Secretary. Committee on Meteorology.

The CHIEF SIGNAL OFFICER,
Washington, D. C.

PENNSYLVANIA STATE WEATHER SERVICE.

Under the direction of the meteorological committee of the Franklin Institute of the State of Pennsylvania.]

PHILADELPHIA, *July* 31, 1888.

SIR: I have the honor to make the following report of the organization of the Pennsylvania State weather service, and its operations, up to June 30, 1888.

At the stated meeting of the Franklin Institute of the State of Pennsylvania for the promotion of the mechanic arts, held December 15, 1886, the report of a special committee, appointed to consider the advisability of establishing a State weather service for Pennsylvania, under the auspices of the Franklin Institute, and in conjunction with the United States Government Meteorological Bureau in Washington, was adopted and the committee was continued, with instructions to carry into effect the plans proposed.

The recommendations contained in the report of this committee were as follows:

"That the Franklin Institute at once organize a 'State weather service' for Pennsylvania, having for its object the collection and collation of climatic data and phenomena and the dissemination of the weather forecasts, storm and frost warnings of the Signal Service.

"That the work of taking observations, disseminating forecasts, warnings, etc., be accomplished by volunteer service.

"That the co-operation of railroad companies, telegraph companies, telephone companies, newspapers, and others who can materially aid in the dissemination of information be solicited.

"That the offer of the Chief Signal Officer of the Army to furnish a member of the Signal Corps to assist in the work be accepted.

"That an effort be made to secure an appropriation of $3,000 from the State for the purchase of instruments and for the publication of the observations in a tabulated form.

"That all institutions of learning throughout the State be solicited to take an active interest in the collection of meteorological data and the study of the science for practical application to the various pursuits of life.

"That at least one observer be secured in every county of the State, ten of whom should take and record barometric readings.

"That copies of all meteorological data relating to the State be secured and placed on file in the central office.

"That immediate action be taken to secure observers and displaymen, so that the work may be commenced, if possible, on January 1, 1887.

"That if all the work suggested can not be at once carried out, such portions as can be done without expense be started as soon as practicable.

"That the management of this service be placed in charge of a committee appointed by the Institute, with power to regulate the service according to requirements."

T. F. Townsend, sergeant Signal Corps, was detailed to assist the committee in organizing the service. Immediate steps were taken to secure an appropriation from the State.

The sum of $3.000 was appropriated for the purchase of meteorological instruments, signal flags, and other necessary equipments. Several sets of instruments corresponding to those used by the United States Signal Service were at once purchased and sent to the observers as rapidly as the necessary arrangements could be made. Each station was supplied with one instrument shelter, one rain-gauge, one maximum thermometer, one

minimum thermometer, one dry thermometer, one wet thermometer, all mounted complete. A few mercurial barometers were sent to selected stations.

An original record of observations book was prepared, similar to those used by the Signal Service, excepting the hours of observation. As the hours of 7 a m., 2 p. m., and 9 p. m. had been adopted by other State services, these were also adopted by the Pennsylvania State service.

Transportation over the Pennsylvania, Philadelphia and Reading, and Lehigh Valley Railroads were kindly furnished the assistant for State service work by the railroad companies.

Every courtesy has been extended by the editors of the newspapers, and they have aided very materially in bringing the service to its present state of efficiency.

In the selection of observers every care has been taken to secure those who were likely to take an active interest in the work. In most cases the very highest expectations have been realized. Too much praise can not be accorded these volunteer observers for the faithfulness with which they have performed their part.

With a body of competent observers, instruments of the best make, shelters of an approved pattern, Pennsylvania to-day possesses a service second to none.

Numerous display stations have been established for the dissemination of the Signal Service indications and warnings. These stations have met with popular favor and are steadily being increased. Negotiations have been for some time pending, looking toward the establishment, with the co-operation of the railroad companies, of a display station at each of the principal stations along the lines of the leading railways of the State. The large area of the State, the limited means for conducting the service, which imposes the most rigid economy in the expenditure of the funds appropriated to it, and the high standard of excellence required of its observers, make the task of organizing necessarily slow. The dominant idea has been excellence rather than a large showing of unreliable data. Such a service can not fail to be of value, and it is hoped that the county agricultural societies, farmers' clubs, and other local organizations will soon lend their aid in forwarding the efficiency of the service by systematic co-operation.

During the seeding, growing, and harvest season crop-weather reports (Form No. 122—G) have been received from an average of thirty stations each week. During this year these have been collated and published in the form of a crop-weather bulletin and extensively circulated and published in the State papers. These reports meet a long-felt want and they should be increased until the exact crop conditions are known weekly in every county of the State. By this means producer, consumer, speculator, and all are placed on an equal footing and false reports fail to do the injury heretofore possible. By telegraphing each Saturday the crop conditions of the State to the Chief Signal Officer these reports have formed a portion of the weekly crop bulletin issued by him. These in turn have been published by the larger daily papers in the various States, thus giving a very extensive circulation to the crop reports.

The September (1887) reports were the first published, since which time they have been continued regularly. Each monthly review contains reports from the following number of stations:

September, 20; October, 32; November, 34; December, 33; January, 42; February, 45; March, 53; April, 52; May, 56; June, 54. The number of weather-signal display stations at the end of June, 1888, was 53.

The Monthly Review is printed as a supplement in the Journal of the Franklin Institute, which insures it a large and influential circulation; in addition to which some 800 copies are issued in separate form from the central office.

A continued effort has been made to collect the data of the many observers throughout the State whose records antedate those of the service. A few counties are still unrepresented, notwithstanding the fact that continuous efforts have been made to secure suitable observers by correspondence and through the press. No doubt they could be found if the assistant had the time and funds necessary to visit the different localities.

The service has now reached such proportions that the work of the central office has become arduous, and progression means additional labor; and without additional help some parts of the organization must of necessity be neglected. Each station should be inspected, and when necessary personal instruction given to the work.

Even with free transportation furnished, there are other expenses incident to travel which are not provided for. This, together with the lack of time, makes it impossible to do full justice to the work in hand. As every one interested appears to understand the situation, the assistant's efforts have been properly gauged and appreciated, and he has received the utmost courtesy and encouragement from all with whom he has been associated.

Very respectfully, your obedient servant,

T. F. TOWNSEND,
Sergeant, Signal Corps, Assistant.

The CHIEF SIGNAL OFFICER,
Washington City.

WEATHER-CROP BULLETIN FOR THE WEEK ENDING SATURDAY, JULY 23, 1888, OF THE PENNSYLVANIA STATE WEATHER SERVICE.

[In co-operation with the United States Signal Service.]

The temperature for the past week has been slightly below the average, with a large percentage of sunshine.

The rainfall has been light in some sections and abundant in others. Carlisle, .005; State College, .00; Hollidaysburgh, .42; Charlesville, .03; Somerset, .68; Philipsburgh, .01; Swarthmore, .10; Wysox, .00; Lebanon, .07; Dyberry, 1.20; Selins Grove, .50; Quakertown, .27; Pottstown, .16; York, .05; Montrose, .70; Johnstown, .70; Columbus, .94.

Most of the rainfall occurred on two days.

The weather conditions were excellent for growth and general farm work. Oat harvest continued during the week, and will be fully up to the average. The wheat, rye, and hay yield was large, and is about all secured. Corn and potatoes are growing rapidly and promise abundant crops. Some sections need rain, particularly on pasture lands.

EXTRACTS FROM REPORTS.

Philipsburgh.—All crops doing well.

Charlesville.—Timothy hay being cut. Corn in excellent condition.

Hollidaysburgh.—Vegetation of all kinds very luxuriant. Some barley and oats not yet cut. Potatoes and corn growing finely.

Wysox.—No rain. Springs low. Corn, potatoes, and garden truck have not suffered seriously. Nights cool. Heavy dew.

Somerset.—Wheat harvested. Average crop. Oats ripening. Corn and potatoes doing finely. Farmers happy.

State College.—The fair weather has greatly benefited the corn crop and the ripening of oats.

Carlisle.—Most farmers are through cutting oats. Corn promises a big crop. Potatoes will be an immense crop.

York.—Weather most favorable. Corn in tassel and looks well. Tobacco improving. Early plants ready to top. Grape crop will be large. Early potatoes in fine condition. Oats half harvested.

Lebanon.—Oats are being cut, and are very good generally.

Dyberry.—Very dry before the 19th. Many farmers report only two-thirds crop. Very light crop of early potatoes.

Selins Grove.—Best wheat, rye, and oat harvest for five years.

Quakertown.—Oat harvest commenced. Pasture fields look dried up. Corn has not suffered much. Garden truck has considerably.

Pottstown.—Rain much needed for all growing crops.

Shoemakersville.—Harvesting oats. Corn in tassel. Potatoes good.

Montrose.—Crops look fair. Need rain badly.

Johnstown.—Harvesting nearly over. Conditions favorable.

Columbus.—Oats, corn, and potatoes good. Show for large crops.

Kutztown.—Oats nearly cut. Well laden. Pastures need rain.

T. F. TOWNSEND,
Sergeant, Signal Corps, Assistant.

HALL OF THE FRANKLIN INSTITUTE.
Philadelphia.

[Inclosure XX.]

SOUTH CAROLINA STATE WEATHER SERVICE.

COLUMBIA, S. C., *July* 1, 1888.

SIR: In compliance with your request of June 5, 1888, I beg to submit the following report of the South Carolina weather service for the fiscal year ended June 30, 1888.

This service has at this time sixty-three display stations, twenty-five of which are on Western Union wires and thirty-eight on railroad lines. Care has been taken to establish the stations at such points as are demanded by the public interest. Extra instruments have been purchased and issued to competent individuals during the year, and at the present time the number of meteorological stations have increased to thirty-two, fifteen being the number in last year's report. During the crop season reports are re-

ceived from the cotton-belt observers, swelling the number to forty-three. The following is a complete list of observers reporting to this office:

Name of observer.	Station.	County.
W. H. Geddings, M. D.	Aiken	Aiken.
J. C. Klugh	Abbeville	Abbeville.
C. B. Farmer	Allendale	Barnwell.
D. P. Hartley	Batesburgh	Edgefield.
J. H. Wells	Bennettsville	Marlborough.
Pinckney Brown	Belfast	Barnwell.
Joseph Black	Blacks	York.
Samuel S. Turner	Blackville	Barnwell.
N. Nielson	Brewer Mines	Chesterfield.
James R. Ligon	Branchville	Orangeburgh.
James E. Beaty	Bucksville	Horry
John F. Bayerly	Cedar Springs	Spartanburgh.
W. R. Godfrey	Cheraw	Chesterfield.
W. S. Merritt	Chester	Chester.
W. S. Lee	Clinton	Laurens.
Wm. Line	Columbia	Richland.
J. H. Smith	Charleston	Charleston.
J. G. Rogers	Conway	Horry.
J. W. Earle	Evergreen	Anderson.
J. R. Schorb	Yorkville	York.
John E. Humphries	Windsor	Aiken.
P. H. Walshe	Florence	Darlington.
W. G. Sease	Georges	Colleton.
W. V. Ellis	Greenwood	Abbeville.
G. T. Swandale, M. D.	Greenville	Greenville.
R. H. Sonntag	Graham's	Barnwell.
J. B. Binnicker	Hampton	Hampton.
W. J. Evans	Hardeeville	Beaufort.
S. J. Rump	Jacksonborough	Colleton.
Colin Macrae	Kirkwood	Kershaw.
P. B. Thorne	Kingstree	Williamsburgh.
S. H. Price	Marion	Marion.
W. G. Peterson	Newberry	Newberry.
George H. Cornelson	Orangeburgh	Orangeburgh.
W. W. Anderson, M. D.	Stateburgh	Sumpter.
W. J. Seibels	Sandy Run	Lexington.
E. Wofford	Spartanburgh	Spartenburgh.
P. D. Mazyck	Saint Matthews	Orangeburgh.
H. L. Morris	Timmonsville	Darlington.
E. Gillard	Trial	Berkeley.
George H. Oetzel	Union	Union.
S. Landes	Williamston	Anderson.
James Pagan	Winnsborough	Fairfield.

These gentlemen have devoted their time to this service without compensation, and to them thanks are due for their valuable assistance.

During the year a number of sets of signal flags have been purchased and issued, also old flags replaced by new ones, etc.

Telegrams, indications, and cold-wave warnings have been sent daily to display stations, Sundays excepted.

These reports are received with great favor by the public.

The percentage of verification of these reports for the year is, for weather 82.2, for temperature 88.1.

Beginning with March 31, 1888, the Weekly Crop Bulletin was issued from this office Saturdays of each week. One hundred correspondents furnished the data, showing the effect of the weather on the various crops during the past seven days.

This information has been given the press and the pith of the matter sent to you by telegraph. A copy of the bulletin has also been sent to all furnishing the information. These reports have been anxiously received by the people, who consider them valuable. At the time of writing we have a number of instruments on hand, which I expect at an early date to see distributed, so that reports may be received from every county in the State. On the whole I think the service is in good condition, having doubled its number of stations of observations in the last six months.

Yours, very truly,

A. P. BUTLER,
Director.
WM. LINE,
Sergeant, Signal Corps;
H. C. SEYMOUR,
Private, Signal Corps, Assistants.

The CHIEF SIGNAL OFFICER,
Washington, D. C.

South Carolina Weather Crop Bulletin.

The South Carolina weather service furnishes the following data concerning the effect of the weather on the various crops for the week ending August 13, 1887:

RAINFALL.

The rainfall for the past week has been above the average, especially during the first half; fair weather prevailed during the last half of the week and crops improved generally. On the whole, however, the rainfall of the week has been unfavorable for both corn and cotton, more especially in some of the upper counties.

TEMPERATURE.

The temperature has been about the average, and has affected the crops favorably. The first three days were rather cool, but this has produced no unfavorable results.

SUNSHINE.

Sunshine was reported slightly below the average in the upper counties; elsewhere there was about the average amount, which has been generally favorable for the crops.

CONDITION OF CROPS.

Under the influence of favorable weather conditions during the last few days crops have been benefited, and the prospect is somewhat better than that for the week ending August 6. Cotton, especially on sandy lands, is reported as shedding fruit to great extent, and rust is reported in some sections. Bottom-land crops on the Savannah and Wateree Rivers are reported totally destroyed, and much damage has been done on Saluda and Broad Rivers and in the Pacolet bottoms. Upland corn is in find condition, with prospects for a large yield. Fodder pulling is now general, and with the fine weather of the last few days much has already been gathered in fine condition. Caterpillars are reported in Orangeburgh, Barnwell, and Sumter Counties.

A. P. BUTLER,
Director.

[Inclosure XXI.]

TENNESSEE STATE WEATHER SERVICE.

OFFICE STATE BOARD OF HEALTH,
Nashville, Tenn., July 2, 1888.

SIR: We have the honor to submit herewith a report of the transactions of the meteorological department of the State board of health for the past year.

About the 1st of July of last year a communication was received from the Chief Signal Officer authorizing the establishment of fifty stations in the State for the purpose of receiving and displaying the daily indications sent out from the central office at Washington. Under the instructions contained in the communication we designated the following-named stations as among the most important as regarding agricultural and commercial interests, the citizens furnishing the signal flags and agreeing to display them properly on receipt of the telegrams: In East Tennessee, Bristol, Johnson City, Jonesborough, Greenville, Rogersville, Morristown, Mossy Creek, London, Clinton, Athens, Dayton, South Pittsburg, and Jasper; in Middle Tennessee, Winchester, Fayetteville, Tallahoma, Cookville, Shelbyville, Hartsville, Gallatin, Springfield, Clarksville, Columbia, Lewisburgh, Pulaski, Franklin, Lebanon, Mount Pleasant, Lawrenceburgh, and Centreville; and in West Tennessee, Paris, McKenzie, Huntington, Milan, Martin, Union City, Jackson, Bolivar, Somerville, Ripley, and Covington.

A few of these stations were discontinued after a few months' service, but the others continue to display the signals. In addition to these regular stations a large number of places receive and display the cold-wave warnings, where communication can be had by telephone. It is gratifying to note that with a few exceptions these daily indications and cold-wave warnings are much appreciated by the citizens of the communities in

which they are displayed, and in some instances they have been means of saving to the citizens many thousands of dollars.

The weather crop bulletins, which were issued weekly during the spring and summer of last year, were resumed last March. They have become of general interest, and especially to those interested in the production, handling, and carrying the staple crops of our State. In addition to the telegrams sent to Washington, condensed from the various reports received weekly, we have issued a more detailed bulletin, which is distributed to various newspapers in the State for publication; also, to observers of this and the weather services of other States, besides a large number of the leading grain merchants, produce dealers, tobacco and cotton factors of the cities of Nashville, Memphis, Chattanooga, and Knoxville, as well as to boards of trade throughout the country.

The State board of health bulletin, in which the monthly meteorological records are published, has an extensive circulation, and these records are thus placed in the hands of a large number of persons throughout the United States, who have an interest in climatology. The Tennessee State board of health have always cheerfully co-operated in the work of advancing the interests of meteorology in the State.

The lack of suitable instruments to make complete and satisfactory observations is a great and serious obstacle to our present and future usefulness. Another effort will be made at the coming session of our legislature to secure an appropriation sufficient to purchase good outfits for a certain number of stations, and to place the weather service in the State on a good and more useful and permanent basis.

Since our last report the following-named stations have been discontinued: Manchester, Hurricane Switch, Lexington, Careyville, Vernon, and Sailor's Rest; and during that time the following new stations have been added: Rugby, in January; Watkins, Lewisburgh, and Maryville, in February; Newport, in March; Nunnelly, in September, and Lawrenceburg in October. The station at Sailor's Rest was discontinued on account of the death of Maj. John Minor, who had faithfully served as voluntary observer from the organization of the State weather service.

There are many sections of the State where stations might be placed to advantage, and where, no doubt, much valuable data might be collected, but it is useless to have stations without proper instruments. It is difficult to secure the services of good men as voluntary observers if the proper facilities are not presented to them, consequently this information is lost to the service. We have endeavored to have the stations so distributed that not more than 50 miles would intervene, and if all the observers would report regularly the territory could be pretty well covered; but we regret to say that some of them do not seem to appreciate the value of an unbroken record, and make their reports at intervals. The great majority of the voluntary observers, however, we are gratified to say, are prompt and faithful and regular in their reports, and to them more than to any one else does the weather service in the State owe its existence and present importance. When we consider that this work of observing, recording, and reporting involves a considerable amount of time and labor, and this, too, entirely without compensation, we must see what an obligation the people, not alone of Tennessee, but of the whole country, are under to these faithful ones who are making the meteorological history of our State and country.

It is due in this connection to say that the four regular observers of the Signal Service in the State have always given cheerful and hearty co-operation and support in the work. During the year the weather service in the State sustained a serious loss in the withdrawal from the corps of voluntary observers of Mr. Sterling P. Ferguson, who was called away to accept the important position of assistant in the Blue Hill Observatory at Readville, Mass., under the supervision of Mr. H. Helm Clayton, another young Tennesseean, and one of our former observers Mr. Ferguson, although the youngest, was one of our best observers.

In conclusion we would say that the weather service in the State is beginning to be more appreciated as the people are being brought in contact with its practical present benefits and to realize its future value as reference for the statistician of meteorology.

I am, very respectfully, your obedient servant,

J. D. PLUNKET, M. D.,
President State Board of Health,
and Director Meteorological Department.
H. C. BATE,
Private, Signal Corps, Assistant.

The CHIEF SIGNAL OFFICER,
Washington, D. C.

Tennessee weather crop, Bulletin No. 28.

The State board of health, co-operating with the Chief Signal Officer, furnishes the following bulletin for the week ending September 15, 1888:

WEATHER CONDITIONS.

There has been little or no rainfall during the week. The temperature has been about the average, and the percentage of cloudiness very small.

GENERAL CONDITIONS.

During the week the almost uninterrupted sunshine, supplemented by an average temperature, had a very favorable effect on the growth and development of vegetation, which made an abnormal growth under the influence of the warmth and excessive moisture of the week previous. Corn, especially that on bottom lands, was seriously damaged, and in many places the loss will be much greater than at first estimated. On river and creek bottoms, much of it that was blown down in August has been covered with water, and, in its present state, will necessarily sprout and rot; on uplands the loss from these causes, while not so great, will be considerable. Wheat seeding on corn land will be much delayed on account of farmers not being able to gather their corn in its present state—many fields having the stalks so badly blown down and tangled that it is exceedingly difficult to cut and shock and impossible to plow through. Cotton has been damaged to a considerable extent by the rains, making an abnormal growth of stalk and shedding forms rapidly, but the fine weather of the past week has been very favorable for the maturing of the crop, and it is now reported opening rapidly. Picking has begun—two weeks later than last year. The week has been very favorable for cutting and saving tobacco which is reported looking very well. The week has also been favorable for saving hay. Clover and grass are reported making splendid growth, and pastures are in fine condition. Other crops, such as potatoes, turnips, and peanuts, are reported growing finely. Late fruit has been seriously damaged by the wet weather, and is rotting and falling off to a great extent. Stock is in excellent condition. Plowing in stalk and other open lands has progressed rapidly and favorably during the week.

H. C. BATE,
Private, Signal Corps, Assistant.

[Inclosure XXII.]

TEXAS STATE WEATHER SERVICE.

[Organized by the Cotton Exchange in co-operation with the United States Signal Service.]

Monthly weather review of the Texas State weather service for the month of June, 1888.

GALVESTON, *June* 30, 1888.

The State covers such an extended area, and the number of stations now reporting so limited and scattering, that it is not thought practicable to divide it into meteorological districts, which is contemplated should this venture receive the encouragement and support of the people of Texas.

OBJECT.

The object of the State weather service is to collect and utilize data relative to those conditions which affect the prosperity of the inhabitants of the State; to determine accurately its climate; a plan for gathering local meteorological statistics which can be used to define precisely localities most favorable to the growing of fruit, special crops, etc., to enable any one to compare the climate of Texas with the climate of other States.

The data collected and published monthly can be had for reference and information. It will enable the people of Texas to give to any one inquiring about the climate of Texas the information they desire; namely, the mean daily, monthly, and annual temperature; the maximum and minimum temperature; frequency and suddenness of its atmospheric changes; moisture of the air and earth; prevalence of fog, dew, frost, etc.;

amount of rain and snow storms; direction, force, and dryness of its winds; and all conditions relative to atmospheric phenomena which influence organized beings.

This State service will be the means of securing accurate data from every county in the State. It will extend the benefits of the Signal Service to the agricultural districts; put within reach of local agricultural societies the means of obtaining the Government standards of rainfall and temperature, and help to disseminate valuable information now furnished by that department. It will lead to sending to designated points at Government expense of warnings of dangerous storms, floods, frosts, and cold waves.

The State is now on the high road to prosperity, increasing in population and inviting immigration. Nothing will help along the "boom" like a State weather service.

Let it be known that in congenial Texas flowers bloom every month in the year; that the temperature seldom reaches 99°, nor falls much below freezing; that her plains are fanned by cool breezes from the Gulf; that there is an abundance of rain; that snow seldom falls, and does not remain long on the ground; that strawberries are ripe in March, peaches in June, and Texas an empire in itself, and it will not be many years before her fertile prairies will be dotted with flourishing villages and her highways lined with the cottages of prosperous farmers.

We want a volunteer observer in every county, who will take the observations, record them, and send them to the central office. To responsible persons willing to undertake this work the necessary instruments will be furnished free upon the applicant executing the necessary bond covering their value. Blank forms, envelopes, and paper will be supplied at Government expense. It is desired also that the principals of schools throughout the State shall co-operate with the State service in the formation of classes for the study of meteorology, reporting their observations to the central office monthly.

To take and record the observations requires little time daily, and the exercise will be found interesting.

Twenty or more States have State weather services, which are doing work of State and national importance. Let it not be said that Texas is behind the age in enterprise and scientific research. Communications relative to State weather service should be sent to S. O. Young, director State weather service, Galveston, Tex.

INTRODUCTION.

The data used in this review is based upon the records received from sixteen special cotton-region stations, nine regular stations of the Signal Service, and the tri-daily weather reports.

The meteorological feature of the month was the storm which entered southwest Texas on the 15th. On the morning of the 16th it was central near Brownsville; on the 17th, near Corpus Christi; the storm area embracing the greater part of southern and eastern Texas. On the morning of the 18th its center was near San Antonio, and on the morning of the 19th it had ceased to exist as an independent storm, having apparently merged into a general depression attendant upon a great depression central west of Dakota. It was attended by heavy precipitation along the coast and in the eastern part of the State, where the country was flooded and travel impeded several days.

During the five days, from the 15th to the 19th, inclusive, precipitation was reported in amounts exceeding 2 inches as follows: Sour Lake, 13.90; Columbia, 9.42; Orange, 8.75; Houston, 8.09; Galveston, 7.56; Tyler, 3.60; Brenham, 3.34; Huntsville, 3.25; Dallas, 3.21; Corpus Christi, 2.74; Rio Grande City, 2.54; Hearne, 211; Brownsville, 2.01.

Although this storm was the marked feature of the month, local storms were frequent and attended by heavy precipitation in some parts of the State. They occurred notably on the 7th, 8th, 9th, 11th, 12th, 14th, 15th, 16th, 17th, 18th, 19th, 20th, 21st, 22d, 23d, 24th, and 25th.

THUNDER STORMS.

The data is incomplete, but from that at hand thunder storms occurred at Galveston on the 17th, 23d, and 24th; at Palestine, 7th, 10th, and 25th; at Fort Elliott, 23d and 26th; at El Paso, 6th; at San Antonio, 6th, 7th, 15th, 16th, and 24th; at Corpus Christi, 17th and 19th; at Houston, 17th, 18th, 23d, and 24th. Compared with reports from other Southern States these storms were not frequent. Montgomery, Ala., reports thunderstorms nearly every day from 11th to 30th.

TEMPERATURE.

The average temperature for the State for June was 80.4°.

The mean of the maximum temperature for the State was 89°; and mean of minimum temperature 72°. At only seven places in the State was the maximum temperature re-

ported 100° and over, and this high temperature occurred on the last three days of the month. El Paso and Sour Lake report 104°, Tyler 103°, and Brenham, Fort Elliott, Longview, and Weatherford 100°.

Maximum temperatures reported from the other stations in the State range between 89° and 99°. This will compare favorably with places in some of the other Southern and Middle States, which report maximum temperature as follows: Augusta, Ga., 99°; Knoxville, Tenn., 95°; Charleston, S. C., 95°; Memphis, Tenn., 94°; Montgomery, Ala., 94°; St. Louis, Mo., 90°.

The absolute range of temperature for the State was 51°.

The average range for the State was 34.5°.

The greatest monthly range reported from any place was 46.6°, at Fort Elliott, and the least monthly range 19°, at Cuero.

Compare these with ranges reported in Alabama, South Carolina, Tennessee, Georgia, and Missouri, and it will be seen that Texas has quite if not a more even temperature: Montgomery, monthly range, 36.8°; Knoxville, 45.3°; Charleston, 33°; St. Louis, Mo., 39.5°; Memphis, 40°; Augusta, 40.9°.

The highest temperature reported in the State was 104°, at Sour Lake, on the 27th and 29th, and the lowest 53°, at Fort Elliott, on the 1st.

At stations of high altitudes the sun's rays act more powerfully on account of the absence of moisture, hence the temperature rises higher during the day and falls lower during the night than it does at stations nearer the level of the sea. The moisture acts as a shield, absorbing the fierce rays of the sun during the day, so that only a portion reaches the earth. At night this shield of vapor prevents too rapid radiation of heat from the earth, hence the temperature near the earth's surface remains nearly constant or falls slowly. This explains the cause of the great range of temperature at Fort Elliott as compared with the range at places in the interior and along the Gulf coast, where the mean daily range scarcely amounts to 20° in the interior and 12° along the coast.

PRECIPITATION.

The average rainfall for Texas for June was 6.10 inches.

The following-named places report amounts exceeding 5 inches: Sour Lake 15.10, Tyler 11 17, Houston 10.93, Orange 10.75, Columbia 10.60, Dallas 10.16, Galveston 9.77, Weatherford 9.08, Huntsville 7.40, Palestine 5.80, Brenham 5.52, Corpus Christi 5.46, Longview 5.30; and the following places amounts less than 2 inches: Cuero 1.46, Fort Elliott 1.34, El Paso .42.

The greatest amount of precipitation in twenty-four hours occurred at Sour Lake, 9.70 inches. Columbia had 7 inches and Galveston 6.40 inches.

The average monthly precipitation for three months, April, May, and June, was, for the State, 5.92 inches.

The amount of precipitation for the three months ending June 30 was somewhat in excess of the amount required to produce excellent crops, but with the soil now thoroughly saturated and fair weather the remainder of the season, Texas will reap a bountiful harvest.

WIND.

High winds occurred at Galveston on the 17th, 18th, and 23d; Fort Elliott 1st; El Paso, San Antonio, 24th; Corpus Christi, 18th; Brownsville 17th; prevailing direction, south. This data embraces the signal-service stations only. In future an effort will be made to have the occurrence of high winds reported from all stations.

SUNSHINE, CLOUDS, AND RAIN.

On an average for the State there were nine days on which rain fell. Fourteen days, including days on which rain fell, the weather was cloudy, and the remainder, sixteen days, clear or fair. Greatest number of days on which rain fell at any station, seventeen, at Houston. Least number of days on which rain fell at any station, one, at El Paso.

OPTICAL PHENOMENA.

Solar halos.—Fort Elliott, 1st; Galveston, 23d; Corpus Christi, 17th.

Lunar halos.—Galveston, 18th; Palestine, 15th and 16th.

The table below shows place of observation, mean temperature, maximum and minimum temperature, monthly range of temperature, number of days' rain and total amount of precipitation:

Place.	County.	Temperature.								Precipitation.		Name of observer.
		Monthly mean.	Maximum.	Minimum.	Maximum.		Minimum.		Monthly range.	No. days rain.	Amount of rainfall.	
					Highest.	Date.	Lowest.	Date.				
											In.	
Abilene	Taylor	78.4	88.1	68.8	99	20	60	24	39	6	2.79	I. M. Cline.
Belton	Bell	79.2	88.3	70.1	95	30	58	1	37	12	3.86	E. A. Sterling.
Brenham	Washington	81.6	90.8	72.5	100	29	64	1, 2	36	14	5.52	J. G. Sloan.
Brownsville	Cameron	80.9	87.7	75.0	92	30	67	1	25	12	2.95	A. D. Crane.
Corpus Christi	Nueces	80.7	84.3	75.1	89	27	66	1	23	10	5.46	J. N. Ryker.
Columbia	Brazoria	79.7	87.7	71.8	96	30	61	1	35	6	10.60	J. S. Rogers.
Corsicana*	Navarro	80.3	91.3	69.3	96	30	61	1	35	4	2.35	E. L. Gibson.
Cuero	DeWitt	85.7	89.5	81.9	96	29	78	16	19	4	1.46	G. M. Pridgen.
Dallas	Dallas	80.7	90	71.4	98	28, 29	61	4	37	10	10.16	H. A. Jones.
El Paso	El Paso	83	97.2	67.8	104	28	60	2	44	1	.42	W. V. Twaddell.
Fort Elliott	Wheeler	75.6	.....	.....	100	20	53	1	47	5	1.34	C. H. Stuller.
Galveston	Galveston	80.2	84.5	76.2	90	30	69	23	21	12	9.77	Allen Buell.
Hearne	Robertson	78.6	86.2	71.1	94	30	59	1	35	8	4.96	S. W. Stoble.
Houston	Harris	81.1	90	72.3	96	30	61	1	35	17	10.93	A. Hutchison.
Huntsville	Walker	81.0	89.8	72.2	95	27, 28, 29	62	1	33	15	7.40	G. Buckingham.
Longview	Gregg	81.7	92.7	70.7	100	28	61	1	39	10	5.30	G. W. Krich.
Luling	Caldwell	81.8	91.4	72.2	98	30	61	1	37	10	3.77	W. J. Pryor.
Orange	Orange	78.4	86.6	72.3	95	30	64	1	31	8	10.75	J. B. Brooks.
Palestine	Anderson	77.7	87.2	70.8	94	20	64	3	30	12	5.80	M. H. Perry.
Rio Grande City	Starr	81.2	91.9	73.6	97	28	66	4	31	8	4.00	A. J. Davis.
San Antonio	Bexar	78	87.9	70.7	94	27	61	1	33	12	4.00	John McGlone.
Sour Lake	Jefferson	81.0	91.1	70.9	104	27, 29	62	1	42	6	15.10	F. H. Patrick.
Tyler	Smith	81.7	94.3	69.0	98	30	60	1	38	11	11.17	C. E. Wood.
Waco	McLennan	81.1	91.0	71.3	97	29, 30	61	1	36	8	3.65	W. H. Godber.
Weatherford	Parker	80.2	90	70.5	100	27, 29, 30	56	3	44	9	9.08	M. J. Tucker.

* Nine days missing.

The trades and professions are more or less affected by changes in the weather, and the study of this phenomena is becoming more and more interesting to every man, woman, and child in the country. Let us have an observer in every county in the State.

This summary is not in the form nor style intended when the organization shall have been completed. The remarks following, from the pen of Dr. J. D. Plunket, director of the Tennessee State weather service, is well worth notice. Dr. Plunket says:

"Climatic changes and atmospheric conditions have from the earliest periods been recognized as important factors in modifying or causing many of the diseases affecting the bodies of men or animals. It has been customary to connect the great epidemics with atmospheric peculiarities. While atmospheric changes may not be the immediate cause of disease of the contagious type, they may very considerably influence the effects of the true causes of those diseases, and this specially in regard to the mortality induced by the diseases. The class of diseases springing directly from atmospheric causes and the class springing from contagion is often very refined and it would appear possible, if not probable, that some diseases which are induced by atmospheric variations may pass into the diseases which are communicable by contagion. Common cold or catarrh is one of these diseases on the border line. That common cold is sometimes communicable from one person to another is an hypothesis based on repeated observation, and that from common cold other diseases, more distinctly contagious, such as influenza, may arise, is a theory resting on a good basis of fact. This work the State Board of Health have undertaken, and to that end they have organized a meteorological department."

S. O. YOUNG,
Director.

ALLEN BUELL,
Sergeant, Signal Corps, Assistant.

Weekly Weather Crop Bulletin of the Texas State Weather Service.

GALVESTON, TEX., *September* 15, 1888.

Temperature.—During the week ending September 14, 1888, the temperature in Texas has been about the average, with fair weather and much sunshine. In general, observers report the weather having affected the cotton crops very favorably. The average temperature for the State was 79°. The highest temperature (94°) occurred at Cuero and Brenham; and the lowest (59°) at Weatherford.

Rainfall.—Except in some of the southern counties, very little rain has fallen in Texas during the last week. Brownsville had 3.22 inches, Brenham 1.47 inches, San Antonio 1.01 inches, Columbia .90 inch, Corpus Christi .88 inch, Hearne .80 inch, Galveston .48 inch, Cuero .40 inch, and Orange .09 inch. Total rainfall in the State, 8.25 inches.

GENERAL REMARKS, SPECIAL CORRESPONDENTS.

Oscar Samostz, Austin: Weather fair and favorable to the cotton crop.—*Wm. M. Spitler, Burnet:* Weather fair; has affected the cotton crop very favorably.—*Berry Bros., Brookston:* Cotton very late in this locality on account of having been destroyed by hail in May last; boll-worm has destroyed late cotton; early cotton an average crop.—*J. G. Sloan, Brenham:* Cotton coming in rapidly and stored; held for advance in price.—*Dr. T. C. Osborn, Cleburne:* The weather has been favorable to cotton, which has improved decidedly; it is coming in and selling freely.—*T. B. Elrod, Columbus:* Frequent and unimportant showers in this locality, with two good rains, which were needed; picking is progressing and crops are doing well, but yield was cut short in early season.—*J. P. Berry, Cedar Hill:* Favorable weather for cotton crop; picking in progress. One gin started on the 12th; the other to-day.—*H. D. Donald, Decatur:* The developments in the cotton crop have caused our farmers to be very hopeful of a large yield.—*W. B. Baxter, Henderson:* The past week hot and clear with bright sunshine; worms are eating cotton foliage rapidly; picking active and clean.—*E. T. Page, Ingersoll:* This section will average one-third cotton crop. There may be small top crop if frost does not come too soon.—*G. W. Kreeh, Longview:* Good weather; rain not needed; crops doing well.—*Silas G. Lackey, Mesquite:* Days hot and nights cool; has affected the cotton crop favorably.—*Brownson and Sibley, Victoria:* Rainfall, temperature, and sunshine have affected the crops favorably; hail fell for a few minutes on the 9th instant, about 3 miles north of the city.—*Weatherford:* Will be fair cotton crop but late.—*Waco:* Weather last week has affected cotton crop favorably.

S. O. YOUNG,
Director.

ALLEN BUELL,
Sergeant, Signal Corps, Assistant.

[Inclosure XXIII.]

The following is a sample of the weather-crop bulletins issued weekly from the office of the Chief Signal Officer during the season of planting, growing, and harvesting of the various crops throughout the country, together with a table showing the form in which the data on which the bulletin is based is arranged.

Weather-crop bulletin No. 31, *for the week ending Saturday, September* 22, 1888.

SIGNAL OFFICE, WAR DEPARTMENT,
Washington City, September 23, 1888.

TEMPERATURE.

The week ending September 22 has been slightly warmer than usual in the Middle Atlantic States, on the south Atlantic coast, and from Lake Superior westward to Oregon. It has been slightly cooler than usual in the Southern States, and from 3° to 6° below the average daily temperature of the week from Ohio westward to the Missouri Valley. The temperature for the season has been lower than usual in all sections east of the Rocky Mountains, except in portions of Alabama, western Florida, east Tennessee, and northwestern Georgia, where the seasonal temperature is slightly in excess. Generally throughout the Southern States the deficiency in tem-

perature for the season is less than 1°, while in New England and the Middle Atlantic States the deficiency amounts to 2°, and in the Northwest the daily average temperature has been from 3° to 5° below that of previous years.

RAIN-FALL.

The rain-fall for the week has been greater than usual generally in the Sta es east of the Mississippi, except in the southern portions of the Gulf States, the heaviest rains having occurred in New England and thence southwestward to northern Georgia, the rain-fall in these sections ranging from 2 to 4 inches. Showers occurred west of the Mississippi, but the precipitation for the week was less than usual, except in west portions of Kansas, Nebraska, and Dakota, where the rain-fall slightly exceeded the average for the week. Over the greater portions of Kansas and Nebraska the seasonal rain-fall generally exceeds 20 inches. In southern Dakota it ranges from 18 to 20 inches, and in northern Dakota from 14 to 15 inches. Generally about 80 per cent. of the usual rain fall has occurred in the Lake region and on the south Atlantic coast. The seasonal rain-fall continues largely in excess in the southern portion of the Gulf States, and slightly in excess in the Middle Atlantic States, the interior of New England, the Upper Mississippi and Lower Missouri Valleys, and from southern Kansas southward to the west Gulf coast.

GENERAL REMARKS.

During the week ending September 22 the weather has been generally favorable for all growing crops in the States of the Mississippi Valley. Reports from the corn-belt indicate that the unusually large corn crop is safe from frost. In portions of Kentucky heavy rains injured the tobacco and corn crops probably to the extent of 15 per cent. but the fruit crop has improved. In Tennessee late crops and tobacco are reported as having improved and in fine condition. The weather conditions have also been favorable for wheat seeding throughout the winter-wheat States and as far south as Tennessee. In the cotton-region from Alabama westward to Texas the weather has been generally favorable for all growing crops. Recent rains in Texas improved the late crop of cotton, while some damage is reported to cotton in Tennessee, due to heavy rains. In Louisiana the weather improved the condition of cane and was favorable for rice harvesting and cotton picking. In Alabama and Mississippi conditions are reported as more favorable for the cotton crop. In North and South Carolina the conditions were unfavorable and the crops are thought to be seriously damaged. Heavy rains have affected injuriously the growing crops in New England and the Middle Atlantic States.

A. W. GREELY,
Chief Signal Officer.

Please give this the widest circulation possible.

NOTE.—Reports for the Weather-Crop Bulletin for this season will be discontinued from this date from all States north and west of the Ohio River. The bulletin will be issued for the cotton and tobacco regions and for the States on the Atlantic coast until further notice.

[Form No. 177—1888.]

Weather conditions of wheat, cotton, corn, and tobacco districts for week ending Saturday, September 22, 1888.

Districts and stations.	Departure from normal temperature and rain-fall.							
	For past seven days.				From January 1 to September 22—266 days.			
	Mean temperature.		Rain-fall.		Mean temperature.		Rain-fall.	
	Excess.	Deficiency.	Excess.	Deficiency.	Excess.	Deficiency.	Excess.	Deficiency.
New England States.	°F.	°F.	Inches	Inches	°F.	°F.	Inches	Inches.
Eastport, Me			.74			490		2.57
Portland, Me		24	2.98			1086	8.32	
Boston, Mass		4	1.72			529		3.43
Block Island, R. I		8	.90			789		18.21
Middle Atlantic States.								
Albany, N. Y	21		1.17			670	2.66	
New York City	16		1.81			314	6.84	
Philadelphia, Pa	15		2.49			357	2.98	
Atlantic City, N. J	10		.26			498	2.65	
Baltimore, Md	15		1.36			636	1.30	
Washington City	12		1.57			545	1.43	
Lynchburgh, Va		5	2.31			486	6.95	
Norfolk, Va	17		.05			533	5.64	
South Atlantic States.								
Charlotte, N. C		10	.52			18		1.77
Raleigh, N. C								
Hatteras, N. C								
Wilmington, N. C	15			1.04		322		5.17
Charleston, S. C	12			.97		201		11.43
Augusta, Ga		13	.28			140		.96
Savannah, Ga	4		1.22			394		9.03
Jacksonville, Fla	3			1.06		171		3.28
Florida Peninsula.								
Key West, Fla		4		.34		177		7.94
Cedar Keys, Fla	5		.32		247			15.06
Gulf States.								
Atlanta, Ga		18	2.22			6	7.18	
Pensacola, Fla		5		1.07	217			.58
Mobile, Ala		17		1.19		253	16.59	
Montgomery, Ala		11		.57	63		7.41	
Vicksburg, Miss		7		.34		368		4.31
New Orleans, La		10		1.12		378	20.64	
Shreveport, La		17		.95		300		5.29
Fort Smith, Ark		25		.39		54	8.10	
Little Rock, Ark		19	.47			196	.32	
Palestine, Tex		12		.71		317	13.78	
Galveston, Tex	2			1.00		389	11.83	
San Antonio, Tex		19		.59		662	7.45	
Corpus Christi, Tex								
Brownsville, Tex		20		.76		352		2.80
Rio Grande City, Tex								
Ohio Valley and Tennessee.								
Memphis, Tenn	1		.03			288		8.94
Nashville, Tenn		22	1.32			531	.49	
Chattanooga, Tenn		20	.02		23			2.00
Knoxville, Tenn		12	1.21		147			.78
Louisville, Ky		12	.06			182	.91	
Indianapolis, Ind		7	.48			662		3.88
Cincinnati, Ohio		9	.00	.00		569		6.49
Columbus, Ohio		29		.27		401		4.82
Pittsburgh, Pa		5		.18		223	3.62	
Lake Region.								
Oswego, N. Y	15		.67			1177		2.15
Rochester, N. Y	12		.82			721		6.96
Buffalo, N. Y	14		.77			579		5.95
Erie, Pa		13		.51		793		7.79
Cleveland, Ohio		6		.22		333		4.76
Sandusky, Ohio		30	.23			774		7.92
Toledo, Ohio		22		.27		1013		4.30

Weather conditions of wheat, cotton, corn, and tobacco districts, etc.—Continued.

Districts and stations.	Departure from normal temperature and rain-fall.							
	For past seven days.				From January 1 to September 22—266 days.			
	Mean temperature.		Rain-fall.		Mean temperature.		Rain-fall.	
	Excess.	Deficiency.	Excess.	Deficiency.	Excess.	Deficiency.	Excess.	Deficiency.
Lake Region—Continued.	°F.	°F.	Inches.	Inches.	°F.	°F.	Inches.	Inches
Detroit, Mich		18		.19		793		3.09
Port Huron, Mich		18	.05			524		7.47
Alpena, Mich	2		.37			516		5.37
Marquette, Mich		15	1.18			1380	1.43	
Grand Haven, Mich		29	.99			1061		8.74
Milwaukee, Wis		24		.12		893		7.22
Chicago, Ill		30	.04			789		4.61
Duluth, Minn	1			.64		1298		1.41
Upper Mississippi Valley.								
Saint Paul, Minn		16		.50		1410	.39	
La Crosse, Wis		45		.22		1525	5.24	
Davenport, Iowa		33	.38			1143	4.41	
Des Moines, Iowa		32		.53		874		4.60
Keokuk, Iowa		30	.19			1006	1.29	
Springfield, Ill		40	.43			959		.66
Cairo, Ill		13		.47		537		2.49
Saint Louis, Mo		34	.40			551	2.50	
Missouri Valley.								
Springfield, Mo								
Leavenworth, Kans								
Omaha, Nebr		17		.82		870		7.44
Yankton, Dak		10		.65		696		4.84
Valentine, Nebr		39		.33		730	6.73	
Huron, Dak		22		.31		781		2.30
Extreme Northwest.								
Moorhead, Minn		10		.23		816		8.70
Saint Vincent, Minn	5		.08			822		.84
Totten, Fort, Dak	2			.07		519		.15
Bismarck, Dak		4		.28		809		2.23
Buford, Fort, Dak	21		.24			608	2.00	
Rocky Mountain Slope.								
Assinaboine, Fort, Mont	32			.12		723	2.64	
Helena, Mont	38			.27	333			4.07
Custer, Fort, Mont	30		24			285	1.49	
Rapid City, Dak								
Cheyenne, Wyo		3	.05		139		3.56	
North Platte, Nebr		32	.30			423		.36
Denver, Colo		8		.13		21		4.24
Dodge City, Kans		7	.35			34	3.81	
Concordia, Kans		18		.77		116		2.24
Elliott, Fort, Tex		1		.49	398			7.12
Sill, Fort, Ind. T		25		.47		488	5.12	
Abilene, Tex	14			.94		330		1.89
Davis, Fort, Tex	10			.10		146		1.99
Interior Plateau.								
El Paso, Tex	9			.27	159			1.63
Salt Lake City, Utah	19		.29		383			3.95
Pacific Coast.								
Olympia, Wash	10		.88		220			3.51
Portland, Oregon	3		.58		213			7.14
Roseburgh, Oregon	7		.23		391			.76
Red Bluff, Cal		5		.14	184			3.23
Sacramento, Cal	15			.07	163			5.69
San Francisco, Cal		9		.04		90		2.17
Los Angeles, Cal		2		.04		69		1.88
San Diego, Cal	7		.03		124			1.02

Issued at the Signal Office, Washington City, September 23, 1888.

A. W. GREELY,
Chief Signal Officer.

[Inclosure XXIV.]

The following special bulletin was issued from the office of the Chief Signal Officer October 1, 1888, showing the number of days the season was early or late (plus sign denoting early, and the minus sign late); also the percentage of rain-fall for July, August, and September, and from January 1 to October 1, 1888:

Special bulletin of weather-crop conditions, showing the number of days the season was early or late; also the percentage of rain-fall for July, August, and September, and from January 1 to October 1, 1888.

Districts and stations.	Season: Days early or late (+ early; — late).				Percentage of rain-fall.			
	July.	August.	September.	January 1 to October 1.	July.	August.	September.	January 1 to October 1.
New England States.								
Eastport, Me	—1	—2	—2	—10	73	125	151	94
Portland, Me	—2	—1	—3	—21	51	112	271	133
Boston, Mass	—1	(*)	—2	—11	49	136	228	94
Block Island, R. I	—3	.....	—2	—14	5	.....	181	52
Middle Atlantic States.								
Albany, N. Y	—1	(*)	—2	—13	59	143	142	107
New York City	—1	(*)	—1	— 6	32	124	232	119
Philadelphia, Pa	—2	(*)	—2	— 7	80	113	180	108
Atlantic City, N. J	—1	(*)	—1	— 9	70	80	227	111
Baltimore, Md	—2	(*)	—2	—11	64	129	132	101
Washington City	—2	—1	—2	—10	96	63	178	102
Lynchburgh, Va	—2	—1	—3	— 9	85	143	328	119
Norfolk, Va	—2	—1	—1	— 9	99	126	128	113
South Atlantic States.								
Charlotte, N. C	—1	(*)	—2	— 2	30	137	280	94
Wilmington, N. C	—2	—1	—1	— 6	74	64	115	86
Charleston, S. C	—2	—1	—1	— 4	85	101	85	73
Augusta, Ga	—1	—1	—2	— 3	42	88	208	95
Savannah, Ga	—2	—1	—1	— 6	14	96	191	77
Jacksonville, Fla	—1	—1	—2	— 3	137	72	143	90
Florida Peninsula.								
Key West, Fla	(*)	(*)	(*)	— 2	211	47	76	77
Cedar Keys, Fla	—1	(*)	—1	+ 3	38	18	261	66
Gulf States.								
Atlanta, Ga	—1	(*)	—2	— 1	76	91	487	117
Pensacola, Fla	(*)	(*)	—1	+ 2	35	89	83	96
Mobile, Ala	—1	—1	—2	— 4	83	215	60	129
Montgomery, Ala	(*)	(*)	—2	(*)	151	179	206	119
Vicksburg, Miss	—1	—1	—2	— 6	76	335	29	87
New Orleans, La	(*)	—1	—1	— 6	33	415	86	141
Shreveport, La	—1	—1	—1	— 5	76	164	29	84
Fort Smith, Ark	(*)	(*)	—2	— 2	119	245	24	123
Little Rock, Ark	(*)	(*)	—1	— 4	115	285	44	99
Galveston, Tex	—1	—1	—1	— 6	43	289	56	135
Palestine, Tex	—1	—1	—2	— 5	158	157	9	138
San Antonio, Tex	—1	(*)	—2	—10	16	214	43	126
Ohio Valley and Tennessee.								
Chattanooga, Tenn	(*)	(*)	—2	— 1	57	125	118	96
Memphis, Tenn	(*)	—1	—1	— 5	71	311	33	77
Nashville, Tenn	—1	—1	—2	— 9	47	212	109	99
Knoxville, Tenn	(*)	(*)	—2	+ 1	70	75	233	98
Louisville, Ky	(*)	—1	—2	— 4	104	221	95	101
Indianapolis, Ind	—1	—1	—2	—12	63	153	46	87
Cincinnati, Ohio	—1	—1	—2	—10	53	185	79	78
Columbus, Ohio	—1	—1	—3	— 8	162	104	34	83
Pittsburgh, Pa	—1	—1	—2	— 5	81	206	69	111
Lake Region.								
Buffalo, N. Y	—1	—1	—2	—12	53	51	106	81
Oswego, N. Y	—2	—1	—2	—19	68	172	198	94
Rochester, N. Y	—1	—1	—2	—14	23	103	92	72
Erie, Pa	—1	—1	—2	—15	127	104	68	76
Cleveland, Ohio	(*)	(*)	—2	— 7	56	59	70	85
Sandusky, Ohio	—1	—1	—2	—14	89	41	42	71
Toledo, Ohio	—1	—1	—3	—19	85	54	25	81

Special bulletin of weather-crop conditions, etc.—Continued.

Districts and stations.	Season: Days early or late (+ early; — late).				Percentage of rain-fall.			
	July.	August.	September.	January 1 to October 1.	July.	August.	September.	January 1 to October 1.
Lake Region—Continued.								
Detroit, Mich	—1	—2	— 2	—15	87	179	47	87
Alpena, Mich	—1	—1	— 2	—12	46	98	73	83
Grand Haven, Mich	—1	—1	— 3	—20	51	74	64	88
Marquette, Mich	+1	—2	— 3	—28	43	132	111	111
Port Huron, Mich	—1	—1	— 2	—10	114	26	72	70
Chicago, Ill	(*)	—1	— 2	—15	69	94	32	81
Milwaukee, Wis	—1	—1	— 2	—17	124	104	32	71
Duluth, Minn	—1	—1	— 1	—26	98	111	49	91
Upper Mississippi Valley.								
Saint Paul, Minn	(*)	—2	— 2	—27	158	91	51	98
La Crosse, Wis	(*)	—2	— 3	—28	69	155	12	114
Davenport, Iowa	(*)	—1	— 3	—21	204	55	42	112
Des Moines, Iowa	—1	—1	— 2	—16	87	115	11	84
Keokuk, Iowa	—1	—1	— 3	—18	140	54	58	101
Cairo, Ill	(*)	—1	— 2	— 9	83	182	11	91
Springfield, Ill	(*)	—1	— 3	—17	200	29	44	93
Saint Louis, Mo	(*)	—1	— 2	— 9	51	253	37	105
Missouri Valley.								
Valentine, Nebr	(*)	—2	— 1	—14	217	132	36	149
Omaha, Nebr	(*)	—1	— 1	—16	42	82	6	73
Huron, Dak	+1	—2	— 1	—16	87	153	29	86
Yankton, Dak	+1	—2	— 1	—14	55	96	17	78
Extreme Northwest.								
Moorhead, Minn	(*)	—2	(*)	—17	78	7	36	61
Saint Vincent, Minn	(*)	—1	(*)	—18	93	14	75	93
Bismarck, Dak	(*)	—2	(*)	—17	91	76	29	86
Totten, Fort, Dak	(*)	(*)	—11	.....	117	26	107	101
Buford, Fort, Dak	+1	—2	+ 1	—13	89	159	95	115
Rocky Mountain Slope.								
Assiniboine, Fort, Mont	+1	—1	+ 2	—15	35	158	41	119
Custer, Fort, Mont	(*)	—1	+ 2	— 5	74	163	79	112
Helena, Mont	+1	+1	+ 4	+ 8	39	5	18	59
Cheyenne, Wyo	+1	—2	(*)	+ 3	143	92	189	133
North Platte, Nebr	(*)	—2	— 1	— 8	94	15	46	96
Denver, Colo	(*)	—2	— 1	— 1	27	88	12	65
Dodge City, Kans	+1	(*)	— 1	— 1	71	83	54	119
Concordia, Kans	+1	(*)	— 1	— 3	31	5	38	87
Elliott, Fort, Tex	+1	(*)	(*)	+ 6	84	36	34	67
Sill, Fort, Ind. T	.....	.....	— 2	— 8	.....	.....	13	118
Abilene, Tex	(*)	.....	(*)	— 6	31	117	8	82
Davis, Fort, Tex	—1	(*)	— 2	— 3	73	59	87	93
Interior Plateau.								
Salt Lake City	+1	(*)	+ 3	+ 7	35	80	56	67
Pacific Coast.								
Olympia, Wash	(*)	(*)	+ 3	+ 5	150	48	56	88
Roseburgh, Oregon	(*)	+2	+ 3	+ 8	183	0	65	96
Portland, Oregon	(*)	+2	+ 3	+ 5	63	0	59	76
San Francisco, Cal	(*)	—1	(*)	— 2	0	0	649	86
Red Bluff, Cal	(*)	+1	+ 2	+ 4	700	67	53	80
Sacramento, Cal	(*)	+1	+ 2	+ 3	0	0	200	62
Los Angeles, Cal	(*)	—1	(*)	— 1	200	450	19	85
San Diego, Cal	+1	(*)	+ 1	+ 2	0	0	100	86

* Normal.

Issued at the Signal Office, Washington City, October 1, 1888.

A. W. GREELY,
Chief Signal Officer.

[Inclosure XXV.]

The following letter was sent to all persons displaying the weather and temperature and cold-wave signals from telegrams transmitted at the expense of the Signal Service:

SIGNAL OFFICE, WAR DEPARTMENT,
Washington City, June 1, 1888.

SIR: Owing to the curtailment of a portion of the appropriation for the ensuing fiscal year, for distributing the indications and cold-wave warnings for use in the display of weather signals, it is incumbent upon the Chief Signal Officer to use careful discrimination in disseminating these reports, and in continuing them after July 1 proximo, to those already authorized.

In view of this fact the Chief Signal Officer desires that you inform him on or before June 25, 1888, of any special reasons why the reports now furnished you should be continued, as it is deemed but just that special causes should receive due consideration when the reduction is made.

In case no reply is received from you before the date named, it will be understood that you do not desire the telegraphic reports continued to your address after June 30, 1888.

An envelope is inclosed for your reply.

I am, very respectfully, your obedient servant,

A. W. GREELY,
Chief Signal Officer.

[Inclosure XXVI.]

The following are copies of letters sent to directors of the various State weather services with reference to the use of the official frank in the distribution of bulletins, etc.:

SIGNAL OFFICE, WAR DEPARTMENT,
Washington City, July 20, 1888.

SIR: Referring to the use of the official frank in the distribution of monthly reports, weekly weather-crop bulletins, etc., of State weather services, the Chief Signal Officer directs me to inform you that it is in accordance with the spirit of the law governing the use of the frank to use same in mailing publications of the character referred to either to this office, to Signal Service observers detailed as assistants to directors of weather services in other States, to Signal Service and co-operating voluntary observers within your State, to boards of trade, commercial exchanges, the press, and also such public bodies or institutions as receive Signal Service publications. A more extended use of the frank than is above outlined is not authorized. No franked envelope or wrapper will be distributed without having first been properly addressed for official use.

Very respectfully,

H. H. C. DUNWOODY,
First Lieutenant Fourth Artillery, A. S. O. and Assistant.

SIGNAL OFFICE, WAR DEPARTMENT,
Washington City, July 24, 1888.

SIR: Referring to circular letter of the 20th instant from this office relative to the use of the frank in mailing official publications of State weather services, the Chief Signal Officer directs me to further inform you that the instructions contained in the letter referred to were not intended to preclude the use of the frank in distributing the weekly and monthly bulletins or other official data to the press, to boards of trade, commercial exchanges, and also to such public bodies or institutions as receive Signal Service publications.

Very respectfully,

H. H. C. DUNWOODY,
First Lieutenant Fourth Artillery, A. S. O. and Assistant.

NOTE.—The penalty envelope can not be used in distributing State weather service bulletins containing business advertisements.

[Inclosure XXVII.]

The following is a copy of the form of personal bond required by the Signal Service of voluntary observers to whom meteorological instruments may be issued:

[Form 63c—1888.]

PERSONAL BOND.

(To be in triplicate.)

Know all men by these presents, that I, ————, of ——, county of —— and State of ——

1st. Hold myself personally and pecuniarily responsible for the safe custody of the Signal Service instruments committed to my care, and for the return of the same when no longer needed for the purpose for which issued.

2d. That I promise to render a quarterly report (viz., on March 31, June 30, September 30, and December 31), either by letter or on a form to be furnished for that purpose, of the condition of said Signal Service instruments in my care, to the Chief Signal Officer of the Army.

3d. That I promise to make the observations specially agreed on and to render monthly reports thereof to the Chief Signal Officer of the Army.

4th. That I promise to pay the full value of any of the instruments which may be lost or damaged, through neglect or fault on my part, while in my possession or under my control, or to furnish the necessary affidavit showing the circumstances of the loss or damage when lost or damaged from unavoidable accident or other cause not within my control.

(Signature) —— ——.

WITNESS:

—— ——.

—— ——, 88:

On this —— day of ——, 188—, personally appeared before me the above-named —— ——, who, being duly sworn, according to law, acknowledges the foregoing to be his free act and deed.

[SEAL.] —— ——,

————.

NOTE.—To be executed before a clerk of a court of record, or other officer competent to administer oaths, who should affix his seal.

LIST OF INCLOSURES.

I. Report of the director of the Alabama weather service. (2935 Sig. '88.)
II. Report of the director of the Arkansas weather service. (3750 Sig. '88 and Bulletin for April, 1888.)
III. Report of the director of the Colorado weather service. (Bulletin for May, 1888.)
IV. Report of the director of the Illinois weather service. (2845 Sig. '88.)
V. Report of the director of the Indiana weather service. (2571 Sig. '88.)
VI. Report of the director of the Kansas weather service. (Bulletin for May, 1888.)
VII. Report of the director of the Louisiana weather service. (4942 Obs. '88.)
VIII. Report of the director of the Michigan weather service. (5268 Obs. '88.)
IX. Report of the director of the Minnesota weather service. (3304 Sig. '88.)
X. Report of the director of the Mississippi weather service. (2882 Sig. '88.)
XI. Report of the director of the Missouri weather service. (3209 Sig. '88.)
XII. Report of the director of the Nebraska weather service. (2936 Sig. '88.)
XIII. Report of the director of the Nevada weather service. (3011 Sig. '88.)
XIV. Report of the secretary of the New England Meteorological Society. (2559 Sig. '88.)
XV. Report of the director of the New Jersey weather service. (5513 Obs. '88.)
XVI. Report of the director of the North Carolina weather service. (3219 Sig. '88.)
XVII. Report of the director of the Ohio Meteorological Bureau. (3250 Sig. '88.)
XVIII. Report of the director of the Oregon weather service. (5268 Obs. '88.)
XIX. Report of the director of the Pennsylvania weather service. (2975 Sig. '88.)

XX. Report of the director of the South Carolina weather service. (2786 Sig. '88.)
XXI. Report of the director of the Tennessee weather service. (3099 Sig. '88.)
XXII. Report of the director of the Texas weather service. (Bulletin for June, 1888.)
XXIII. Sample of weather-crop bulletin issued weekly by the Chief Signal Officer, with table showing data on which it is based.
XXIV. Copy of special bulletin issued by the Chief Signal Officer on October 1, 1888, showing whether the crop season was early or late, with percentages of rain-fall.
XXV. Copy of letter sent by the Chief Signal Officer, June 1, 1888, to all persons receiving the "indications" by telegraph at expense of the signal service.
XXVI. Copies of letters sent by direction of the Chief Signal Officer to directors of State weather services relative to the use of the penalty envelope in the distribution of publications.
XXVII. Copy of form of personal bond required of voluntary observers to whom signal service instruments may be issued.

APPENDIX No. 6.

RIVERS AND FLOODS.

Special river stations opened and closed during the fiscal year ending June 30, 1888.

Stations.	Date.	Stations.	Date.
Opened:		Opened:	
Sioux City, Iowa	July 1	Louisa, Ky	July 1
Madison, Ark	July 1	Falmouth, Ky	July 1
Frankfort, Ky	July 1	Manhattan, Kans	Aug. 10
Portsmouth, Ohio	July 1	Closed:	
Zanesville, Ohio	July 1	Colusa, Cal	Nov. 3
Gallipolis, Ohio	July 1	Folsom City, Cal	Nov. 3
Circleville, Ohio	July 1	Marysville, Cal	Nov. 3
Charleston, W. Va	July 1	Oroville, Cal	Nov. 3
Hinton, W. Va	July 1	Bayou Sara, La	Nov. 15
Catlettsburgh, Ky	July 1	Kansas City, Mo*	June 30

* Kansas City was opened as a full reporting station of the Signal Service on July 1, 1888; river observations are also continued.

APPENDIX No. 7.

Stations inspected during fiscal year ending June 30, 1888.

Stations.	By whom inspected.	Date.
Abilene, Tex	Lieut. J. H. Weber, Signal Corps	January 27, 28, 1888.
Albany, N. Y	Lieut. T. M. Woodruff, acting signal officer.	August 30, 31, 1887.
Do	Lieut. J. C. Walshe, Signal Corps	February 6–8, 1888.
Alpena, Mich	Lieut. T. M. Woodruff, acting signal officer.	August 7, 8, 1887.
Apache, Fort, Ariz	Lieut. W. A. Glassford, Signal Corps	March 19–22, 1888.
Astoria, Oregon	Lieut. F. Greene, Signal Corps	August 1, 2, 1887.
Assiniboine, Fort	Lieut. F. W. Ellis, Signal Corps	September 22, 23, 1887.
Ashland, Oregon	Lieut. J. A. Swift, Signal Corps	October 27, 1887.
Atlanta, Ga	Lieut. F. R. Day, Signal Corps	January 21–24, 1888.
Atlantic City, N. J	Lieut. F. Greene, Signal Corps	January 16, 17, 1888.
Augusta, Ga	Lieut. F. R. Day, Signal Corps	December 11, 12, 1887.
Auburn, Ala	do	January 20, 1888.
Baltimore, Md	Lieut. T. M. Woodruff, acting signal officer.	July 19, 1887.
Bismarck, Dak	Lieut. F. W. Ellis, Signal Corps	July 6–9, 1887.
Bidwell, Fort, Cal	Lieut. J. A. Swift, Signal Corps	October 22, 1887.
Bly, Oregon	do	October 19, 1887.
Block Island, R. I	Lieut. J. C. Walshe, Signal Corps	January 22, 23, 1888.
Boston, Mass	Lieut. T. M. Woodruff, acting signal officer.	September 13–16, 1887.
Do	Lieut. J. C. Walshe, Signal Corps	January 28–30, 1888.
Boise City, Idaho	Lieut. F. Greene, Signal Corps	November 8–10, 1887.
Bowie, Fort, Ariz	Lieut. W. A. Glassford, Signal Corps	March 27, 28, 1888.
Bridger, Fort, Wyo	Lieut. F. Greene, Signal Corps	November 13–15, 1887.
Brownsville, Tex	Lieut. J. H. Weber, Signal Corps	April 5, 6, 1888.
Buford, Fort, Dak	Lieut. F. W. Ellis, Signal Corps	July 14–16, 1887.
Buffalo, N. Y	Lieut. T. M. Woodruff, acting signal officer.	August 20–23, 1887.
Do	Lieut. B. M. Purssell, Signal Corps	June 28, July 5, 1888.
Cairo, Ill	Lieut. J. C. Walshe, Signal Corps	August 6, 7, 1887.
Canby, Fort, Wash	Lieut. F. Greene, Signal Corps	August 4–6, 1887.
Cape Henry, Va	Lieut. F. R. Day, Signal Corps	November 22, 1887.
Cedar Keys, Fla	do	December 29, 30, 1887.
Cheyenne, Wyo	Lieut. J. C. Walshe, Signal Corps	November 10, 11 1887.
Chicago, Ill	Lieut. T. M. Woodruff, acting signal officer.	August, 1887.
Do	Lieut. F. W. Ellis, Signal Corps	October 30, November 2, 1887.
Do	Lieut. J. Mitchell, Signal Corps	June 16–18, 1888.
Chicamacomico, N. C	Lieut. F. R. Day, Signal Corps	November 26, 1887.
Charleston, S. C	do	December 13, 1887.
Chattanooga, Tenn	do	January 22, 23, 1888.
Charlotte, N. C	do	January 25, 1888.
Cincinnati, Ohio	Lieut. F. Greene, Signal Corps	January 6, 7, 1888.
Do	Lieut. J. Mitchell, Signal Corps	June 4–6, 1888.
Cleveland, Ohio	Lieut. T. M. Woodruff, acting signal officer.	August 16, 17, 1887.
Do	Lieut. J. Mitchell, Signal Corps	June 21–23, 1888.
Concordia, Kans	Lieut. J. C. Walshe, Signal Corps	August 17, 18, 1887.
Colorado Springs, Colo	do	August 26–28, 1887.
Columbia, S. C	Lieut. F. R. Day, Signal Corps	December 10, 1887.
Columbus, Ohio	Lieut. J. Mitchell, Signal Corps	June 8–10, 1888.
Corpus Christi, Tex	Lieut. J. H. Weber, Signal Corps	March 27–29, 1888.
Crete, Nebr	Lieut. J. C. Walshe, Signal Corps	August 19, 20, 1887.
Custer, Mont	Lieut. F. W. Ellis, Signal Corps	July 23, 1887.
Custer, Fort, Mont	do	July 24, 25, 1887.
Davenport, Iowa	Lieut. J. C. Walshe, Signal Corps	December 7, 8, 1887.
Davis, Fort, Tex	Lieut. J. H. Weber, Signal Corps	February 2, 3, 1888.
Deadwood, Dak	Lieut. J. C. Walshe, Signal Corps	November 17, 18, 1887.
Detroit, Mich	Lieut. T. M. Woodruff, acting signal officer.	August 11, 1887.
Do	Lieut. J. Mitchell, Signal Corps	June 21–23, 1888.
Denver, Colo	Lieut. J. C. Walshe, Signal Corps	August 23, 24, 1887.
Des Moines, Iowa	do	December 9, 10, 1887.
Dodge City, Kans	Lieut. F. Greene, Signal Corps	December 6, 7, 1887.
Dubuque, Iowa	Lieut. J. C. Walshe, Signal Corps	December 5, 6, 1887.
Du Cheane, Utah	Lieut. F. Greene, Signal Corps	November 26, 27, 1887.

Stations inspected during fiscal year ending June 30, 1888—Continued.

Stations.	By whom inspected.	Date.
Duluth, Minn	Lieut. F. W. Ellis, Signal Corps	October 16, 17, 1887.
Eastport, Me	Lieut. T. M. Woodruff, acting signal officer.	September 18, 1887.
Edgartown, Mass	Lieut. J. C. Walshe, Signal Corps	January 26, 27, 1888.
Elliott, Fort, Tex	Lieut. F. Greene, Signal Corps	December 11, 1887.
El Paso, Tex	Lieut. J. H. Weber, Signal Corps	January 30, 31, 1888.
Erie, Pa	Lieut. T. M. Woodruff, acting signal officer.	August 18, 19, 1887.
Do	Lieut. B. M. Pursell, Signal Corps	June 26, 27, 1888.
Escanaba, Mich	Lieut. F. W. Ellis, Signal Corps	October 23–25, 1887.
Eureka, Cal	Lieut. J. E. Maxfield, Signal Corps	July 13–15, 1887.
Frisco, Utah	Lieut. F. Greene, Signal Corps	November 17, 18, 1887.
Galveston, Tex	Lieut. J. H. Weber, Signal Corps	January 21–24, 1888.
Glendive, Mont	Lieut. F. W. Ellis, Signal Corps	July 21, 22, 1887.
Grand Haven, Mich	Lieut. T. M. Woodruff, acting signal officer.	July 30, 1887.
Green Bay, Wis	Lieut. F. W. Ellis, Signal Corps	October 25–27, 1887.
Grant, Fort, Ariz	Lieut. W. A. Glassford, Signal Corps	March 8, 9, 1888.
Hatteras, N. C	Lieut. F. R. Day, Signal Corps	November, 1887.
Helena, Mont	Lieut. F. W. Ellis, Signal Corps	July 28, 29, 1887.
Huron, Dak	Lieut. J. C. Walshe, Signal Corps	November 26, 27, 1887.
Indianapolis, Ind	Lieut. F. W. Ellis, Signal Corps	November 3, 4, 1887.
Jacksonville, Fla	Lieut. F. R. Day, Signal Corps	December 16, 17, 1887.
Keeler, Cal	Lieut. J. E. Maxfield, Signal Corps	August 24, 25, 1887.
Keokuk, Iowa	Lieut. J. C. Walshe, Signal Corps	December 11, 12, 1887.
Key West, Fla	Lieut. F. R. Day, Signal Corps	January 3, 4, 1888.
Kitty Hawk, N. C	do	November 25, 1887.
Klamath, Oregon	Lieut. J. A. Swift, Signal Corps	October 15, 1887.
Knoxville, Tenn	Lieut. J. C. Walshe, Signal Corps	August 4, 5, 1887.
Lansing, Mich	Lieut. T. M. Woodruff, acting signal officer.	July 28, 1887.
Lamar, Mo	Lieut. J. C. Walshe, Signal Corps	August 13, 14, 1887.
Laramie, Fort, Wyo	do	November 13, 14, 1887.
La Crosse, Wis	do	December 4, 5, 1887.
Las Animas, Colo	Lieut. F. Greene, Signal Corps	Do.
Lake View, Oregon	Lieut. J. A. Swift, Signal Corps	October 20, 1887.
Lava N. Mex.	Lieut. W. A. Glassford, Signal Corps	April 2, 3, 1888.
Leavenworth, Kans	Lieut. J. C. Walshe, Signal Corps	August 15, 16, 1887.
Lexington, Ky	Lieut. J. Mitchell, Signal Corps	June 7, 8, 1888.
Linkville, Oregon	Lieut. J. A. Swift Signal Corps	October 12, 1887.
Little Rock, Ark	Lieut. F. Greene, Signal Corps	December 29, 30, 1887.
Los Angeles, Cal	Lieut. W. A. Glassford, Signal Corps	June 27–29, 1888.
Louisville, Ky	Lieut. F. Greene, Signal Corps	January 5, 6, 1888.
Do	Lieut. J. Mitchell, Signal Corps	June 7, 8, 1888.
Lynchburg, Va	Lieut. J. C. Walshe, Signal Corps	August 2, 3, 1887.
Mackinaw City, Mich	Lieut. T. M. Woodruff, acting signal officer.	August 5, 6, 1887.
Maginnis, Fort, Mont	Lieut. F. W. Ellis, Signal Corps	September 29, 30, 1887.
Marquette, Mich	do	October 21–23, 1887.
Manchester, N. H	Lieut. J. C. Walshe, Signal Corps	January 31, February 1, 1888.
McDowell, Fort, Ariz	Lieut. W. A. Glassford, Signal Corps	February 23, 24, 1888.
Memphis, Tenn	Lieut. F. Greene, Signal Corps	December 31, 1887; January 2, 1888.
Do	Lieut. J. Mitchell, Signal Corps	June 12–14, 1888.
Milwaukee, Wis	Lieut. F. W. Ellis, Signal Corps	October 27–29, 1887.
Montrose, Colo	Lieut. F. Greene, Signal Corps	December 1, 2, 1887.
Moorhead, Minn	Lieut. F. W. Ellis, Signal Corps	October 14, 15, 1887.
Mobile, Ala	Lieut. F. R. Day, Signal Corps	January 17, 1888.
Montgomery, Ala	do	January 19, 1888.
Nantucket, Mass	Lieut. J. C. Walshe, Signal Corps	February 9–11, 1888.
Nashville, Tenn	Lieut. F. Greene, Signal Corps	January 3, 4, 1888.
Narragansett Pier, R. I	Lieut. J. C. Walshe, Signal Corps	January 19, 20, 1888.
Neah Bay, Wash	Lieut. F. Greene, Signal Corps	August 17, 18, 1887.
New Haven, Conn	Lieut. J. C. Walshe, Signal Corps	January 16, 17, 1888.
New London, Conn	do	January 17, 18, 1888.
New Orleans, La	Lieut. F. R. Day, Signal Corps	January 9–11, 1888.
New York City	Lieut. J. C. Walshe, Signal Corps	January 12–15, 1888.
North Platte, Nebr	do	August 21, 22, 1887.
Norfolk, Va	Lieut. F. R. Day, Signal Corps	November 20, 21, 1887.
Northfield, Vt	Lieut. J. C. Walshe, Signal Corps	February 4, 5, 1888.
Olympia, Wash	Lieut. F. Greene, Signal Corps	August 8, 9, 1887.
Omaha, Nebr	Lieut. F. W. Ellis, Signal Corps	June 30–July 2, 1887.
Oswego, N. Y	Lieut. T. M. Woodruff, acting signal officer.	August 26–28, 1887.
Palestine, Tex	Lieut. J. H. Weber, Signal Corps	January 25, 26, 1888.
Pensacola, Fla	Lieut. F. R. Day, Signal Corps	January 18, 1888.
Phœnix, Ariz	Lieut. W. A. Glassford, Signal Corps	February 25–27, 1888.
Philadelphia, Pa	Lieut. F. Greene, Signal Corps	January 12, 1888.
Pike's Peak, Colo	Lieut. J. C. Walshe, Signal Corps	August 27–29, 1887.
Pittsburg, Pa	Lieut. T. M. Woodruff, acting signal officer.	July 24, 1887.
Port Huron, Mich	do	July 9, 10, 1887.
Portland, Oregon	Lieut. F. Greene, Signal Corps	July 29–31, 1887.

Stations inspected during fiscal year ending June 30, 1888—Continued.

Stations.	By whom inspected.	Date.
Portland, Me	Lieut. T. M. Woodruff, acting signal officer.	September 10–12, 1887.
Portland, Me	Lieut. J. C. Walshe, Signal Corps	February 2, 3, 1888.
Port Angeles, Wash	Lieut. F. Greene, Signal Corps	August 11–13, 1887.
Poplar River, Mont	Lieut. F. W. Ellis, Signal Corps	July 17, 18, 1887.
Prescott, Ariz	Lieut. W. A. Glassford, Signal Corps	April 24–26, May 2, 1888.
Pysht, Wash	Lieut. F. Greene, Signal Corps	August 19, 1887.
Raleigh, N. C	Lieut. F. R. Day, Signal Corps	December 4, 5, 1887.
Red Bluff, Cal	Lieut. J. E. Maxfield, Signal Corps	August 18, 19, 1887.
Reno, Fort, Ind. T	Lieut. F. Greene, Signal Corps	December 16, 1887.
Rio Grande City, Tex	Lieut. J. H. Weber, Signal Corps	April 1–3, 1888.
Rochester, N. Y	Lieut. T. M. Woodruff, acting signal officer.	August 24, 25, 1887.
Robinson, Fort, Nebr	Lieut. J. C. Walshe, Signal Corps	November 15, 16, 1887.
Roseburg, Oregon	Lieut. J. A. Swift, Signal Corps	September 30–October 1, 1887.
Sandusky, Ohio	Lieut. T. M. Woodruff, acting signal officer.	August 14, 15, 1887.
Sacramento, Cal	Lieut. J. E. Maxfield, Signal Corps	August 28, 29, 1887.
San Francisco, Cal	do	August 30–September 2, 1887.
Salt Lake City, Utah	Lieut. F. Greene, Signal Corps	November 19–21, 1887.
Savannah, Ga	Lieut. F. R. Day, Signal Corps	December 14, 15, 1887.
San Carlos, Ariz	Lieut. W. A. Glassford, Signal Corps	March 15, 1888.
San Antonio, Tex	Lieut. J. H. Weber, Signal Corps	March 17–21, 1888.
Santa Fé, N. Mex	Lieut. W. A. Glassford, Signal Corps	April 17, 18, 1888.
Saint Louis, Mo	Lieut. J. C. Walshe, Signal Corps	August 8–10, 1887.
Saint Paul, Minn	do	December 1–3, 1887.
Saint Vincent, Minn	Lieut. F. W. Ellis, Signal Corps	October 11–13, 1887.
Shreveport, La	Lieut. F. R. Day, Signal Corps	January 13, 1888.
Sill, Fort, Ind. T	Lieut. F. Greene, Signal Corps	December 19, 20, 1887.
Southport, N. C	Lieut. F. R. Day, Signal Corps	December 6, 1887.
Smith, Fort, Ark	Lieut. F. Greene, Signal Corps	December 28, 29, 1887.
Springfield, Ill	Lieut. J. C. Walshe, Signal Corps	December 13, 14, 1887.
Spokane, Fort, Wash	Lieut. F. Greene, Signal Corps	August 23, 24, 1887.
Spokane Falls, Wash	do	August 27, 28, 1887.
Springfield, Mo	do	December 24, 1887.
Stevens, Fort, Oregon	do	August 3, 1887.
Sully, Fort, Dak	Lieut. J. C. Walshe, Signal Corps	November 28, 29, 1887.
Supply, Fort, Ind. T	Lieut. F. Greene, Signal Corps	December 9, 10, 1887.
Stanton, Fort, N. Mex	Lieut. W. A. Glassford, Signal Corps	April 6, 7, 1888.
Tatoosh Island, Wash	Lieut. F. Greene, Signal Corps	August 16, 17, 1887.
Terre Haute, Ind	Lieut. F. W. Ellis, Signal Corps	November 2, 1887.
Thomas, Fort, Ariz	Lieut. W. A. Glassford, Signal Corps	March 12, 13, 1888.
Titusville, Fla	Lieut. F. R. Day, Signal Corps	December 20–22, 1887.
Toledo, Ohio	Lieut. T. M. Woodruff, acting signal officer.	August 12, 13, 1887.
Totten, Fort, Dak	Lieut. F. W. Ellis, Signal Corps	October 7–9, 1887.
University, Miss	Lieut. F. R. Day, Signal Corps	January 16, 1888.
Valentine, Nebr	Lieut. J. C. Walshe, Signal Corps	November 20, 21, 1887.
Verde, Fort, Ariz	Lieut. W. A. Glassford, Signal Corps	April 28, 1888.
Vineyard Haven, Mass	Lieut. J. C. Walshe, Signal Corps	January 25, 26, 1888.
Vicksburg, Miss	Lieut. F. R. Day, Signal Corps	January 16, 17, 1888.
Walla Walla, Wash	Lieut. F. Greene, Signal Corps	July 26–28, 1887.
Wash Woods, N. C	Lieut. F. R. Day, Signal Corps	November 23, 1887.
Winnemucca, Nev	Lieut. J. E. Maxfield, Signal Corps	August 21, 22, 1887.
Wilmington, N. C	Lieut. F. R. Day, Signal Corps	December 6–9, 1887.
Wilcox, Ariz	Lieut. W. A. Glassford, Signal Corps	March 6, 1888.
Wood's Holl, Mass	Lieut. J. C. Walshe, Signal Corps	January 24, 25, 1888.
Yankton, Dak	do	November 25, 26, 1887.
Yates, Fort, Dak	Lieut. F. W. Ellis, Signal Corps	October 4, 1887.

Stations of the second order not inspected during fiscal year ending June 30, 1888.

Stations.	Remarks.	Stations.	Remarks.
Carson City, Nev	Headquarters Nevada State weather service. Station opened December 1, 1887.	Pueblo, Colo	Station opened June 27, 1888.
		Rapid City, Dak	Station opened January 1, 1888.
Fresno City, Cal	Station opened August 16, 1887.	San Diego, Cal	Inspector arrived June 30, 1888.
Jupiter, Fla	Station opened January 1, 1888.	Topeka, Kans	Headquarters Kansas State weather service.
McKinney, Fort, Wyo	Station opened December 1, 1887.	Washakie, Fort, Wyo	Station opened January 1, 1888.
Mount Washington, N. H	Station re-opened June 16, 1888	Yuma, Ariz	Inspector en route.
New Brunswick, N. J	Headquarters New Jersey State weather service. Station opened October 1, 1888.		

APPENDIX No. 8.

ANNUAL REPORT OF THE TELEGRAPH DIVISION FOR THE YEAR ENDING JUNE 30, 1888.

THE UNITED STATES MILITARY AND SEA-COAST TELEGRAPH LINES.

General remarks.—Since the acts approved March 3, 1873, and June 23, 1874, which placed the construction, repair, and operation of the sea-coast and military telegraph lines under the charge and control of the Chief Signal Officer, the Signal Service has acquired by original construction—except in a few cases by transfer from the Quartermaster's Department—a total of about 8,250 miles of telegraph lines. The military lines proper were built mostly in Arizona, New Mexico, Indian Territory, Wyoming, Dakota, Montana, Idaho, and Oregon; and they connected together all military posts of importance in circuits of various lengths, one of which exceeded 3,000 miles and another 2,000 miles of continuous telegraph lines. These circuits were maintained until the extension of railroads and commercial telegraph lines admitted of their gradual reduction and abandonment without prejudice to the special interests they were intended to subserve; and at present only about one-third of the total number of miles of telegraph lines constructed remains in operation. The value of the frontier telegraph lines passing through the Indian country, in facilitating military operations, as well as in advancing civilization by the sense of safety and protection they give to settlers, is self-evident. Aside from the important military uses to which the lines have been put, they have afforded to posts and frontier settlements the ordinary personal and business facilities of commercial telegraph lines, and have thus been an important factor in opening the Territories to the farmér, stock-raiser, and miner. This is still in a large measure the case in Arizona, Wyoming, and Oregon, where important settlements have no other telegraphic facilities than those furnished by the military wires. Some of the Pacific coast lines have been of great value to shipping interests in reporting passing vessels and summoning aid in case of marine disaster. The strong and persistent efforts that were made by chambers of commerce and boards of trade to secure an appropriation for the renewal of the broken Columbia River cable fairly illustrate public sentiment in this respect. The line now in course of construction from Point Reyes, Cal., to San Francisco will prove equally important to Pacific coast shipping interests.

In the construction, maintenance, and operation of the military telegraph lines the Signal Corps has employed and is still employing a large percentage of its officers and men, and has paid for civilian operators and repairmen wherever these could be used to greater advantage and economy than its own men; but, as a matter of course, the larger share of the work of construction, where not otherwise provided for by law, fell upon the troops at the various military posts through which the lines were designed to pass. In this manner the lines have been built and operated at a minimum rate of expense, while considerable sums have been turned into the United States Treasury annually, representing the earnings on account of commercial business done over them. At the present date there are employed four officers and eighty enlisted men of the Signal Corps, together with twenty-five civilians, in the administration, operation, and repair of the military and sea-coast telegraph lines, and this force is largely engaged on purely military work, without expense to the Army proper, a feature of the Signal Service for which sufficient credit has never been given it.

The sea-coast lines, as distinguished from the military lines, at one time covered in a single circuit the entire New Jersey coast from Sandy Hook to Cape May, the Delaware and Virginia coasts from the Delaware Breakwater to Chincoteague, and the Virginia and North Carolina coasts from Cape Henry to Cape Fear, together with several short sections on the New England coast.

The act of Congress requiring this sea-coast service contemplated the establishment of signal stations at life-saving stations and light-houses at the most dangerous points on the coast in such a manner that the coast and sea in their vicinity might be kept under constant observation, warning of approaching storms given to vessels within signaling distance, and information of disasters rapidly conveyed to life-saving stations and ports from which aid might be expected. These requirements of the law

have been more or less successfully complied with, and instances where the lines have been the means of saving life and property have occurred during every year of their existence. As an illustration of this the following incident may be cited: On the morning of December 1, 1887, the British steamer *Kimberly* went ashore near Wash Woods, North Carolina. The signal corps operator at that point at once went to the scene of the casualty, established a wreck office, wired news of the stranding to owners, agents, and consignees, and summoned the assistance of the Baker Salvage Company, of Norfolk. Within a few hours of the stranding of the steamer a wrecking expedition was engaged in rendering assistance and in saving cargo and crew. The vessel and cargo were valued at $500,000, and upon the steamer being floated the United States admiralty court awarded the Baker Salvage Company $144,000 salvage. Vessel and cargo would in all probability have become a total loss had it not been for the prompt call made by the Signal Corps operator.

For various reasons the length and number of sea-coast lines in present operation by this service represents only about one-half of the total number of miles constructed. This reduction was made partly on account of the equipment of many life-saving stations with telephone apparatus, which obviated the necessity for skilled telegraph operators, and led to the transfer by this service to the Life-Saving Service of about 150 miles of sea-coast lines, and in some cases lines were abandoned and sold on account of the impossibility of maintaining them in a reasonable state of efficiency without an outlay of money out of all proportion to their public utility. On the exposed "banks" of the North Carolina coast the periodically-recurring cyclones will demolish the most substantially-built lines, whether on wooden or iron poles, and the constant shifting of the numerous inlets prevents the maintenance of submarine cables for any calculable period of time. The operation by this service of the sea-coast lines has, therefore, been restricted to the most dangerous points not otherwise protected, and to such sections of the coast where the lines can be kept in good working order without unreasonable expense. It has heretofore been customary to designate as sea-coast lines the lines on the Atlantic coast only, but in the following description of the various sections all lines not used for strictly military purposes, whether built on the Atlantic or Pacific coast, are referred to as sea-coast lines.

As shown in my last annual report, there were in operation at the beginning of the fiscal year 2,022 miles of military and 331 miles of sea-coast lines, distributed as follows:

	Miles.
Department of Dakota	517
Department of the Missouri	432
Department of California and the Columbia	414
Department of Arizona	457
Department of Texas	124
Department of the Platte	78
Department of the East (sea-coast lines)	331
Total	2,353

For purposes of local administration and supervision the lines are classified by divisions, each under an officer in charge, and detached sections under the local control of chief operators. All lines so classified are authorized to carry on commercial business at rates fixed by the Secretary of War, and final settlement for all line receipts due the United States and connecting commercial lines is made by the officers in charge direct, subject to the examination of their accounts-current at this office before transmittal to the Treasury Department. In addition to the classified lines there are several short wires connecting military posts with the nearest commercial offices, which carry no commercial business, and which are operated under the control of the post commanders. These lines aggregate 80 miles in length.

The telegraph lines owned by the United States and operated by this Service naturally divide into two classes.

(1) The military lines proper, maintained for military purposes only, but which also transact such commercial business as may offer.

(2) The sea-coast lines, which are of no value so far as any military necessity now existing is concerned, but which are of great value to maritime interests, and to residents and visitors at or near the points through which these lines are built.

SEA-COAST LINES.

The lines and cables connecting the islands of Nantucket and Martha's Vineyard with the telegraph system of the country at Wood's Holl, Mass., and the lines and cable connecting Block Island, R. I., with the same system at Narragansett Pier, R. I., are known as the New England division, which has been in the charge of Second Lieut. W. D. Wright, Signal Corps, since July of 1887. The Nantucket and Mar-

tha's Vineyard lines furnish telegraphic communication for a permanent population of probably 7,000 people, and to a summer population of visitors variously estimated at from 40,000 to 60,000 people. In addition to the commercial facilities thus afforded, which add largely to the number of visitors, these lines permit the display of storm-warning signals, the distribution of daily weather indications, and the prompt receipt by telegraph of the observations taken by the operators at the Nantucket office. The extension recently made in these lines in connection with the new cable across Vineyard Sound, admits of the establishment at Gay Head, Martha's Vinyard, of a station for reporting passing vessels, and it is proposed by the Boston Maritime Exchange to place a man there for this purpose. This, taken in connection with the reports now made at other points of vessels passing or in distress, makes this line of inestimable value to shipping interests, as the Gay Head station will command a view of about 60,000 vessels that pass there annually. As an instance of the value of this line to vessels in distress, the ice blockade of January, 1888, is cited, when over fifty vessels were caught in the ice in sight of Nantucket, and it was only by being able to summon powerful tugs and revenue-cutters by means of the Signal Service cables to the main-land that serious disasters were averted. In this one instance the property saved exceeded in value not only the original cost of the line and cable, but also all necessary expenses for some years to come. The meteorological work of this service does not need these lines; they are of no present value from a military point of view, and their use for military purposes appears now a remote contingency; but for commercial purposes their value is beyond question, The cable between Martha's Vineyard and Naushon Island was again broken by a ship's anchor on the night of August 20, 1887, and permanent repairs could not be made until September 24, at a cost of over $1,000. The next and last break in this cable, also caused by an anchor, occurred on the morning of May 14, 1888; but owing to the fact that a new cable was already contracted for, and that the cost of repairing the old one would have exceeded its value for further use, no attempts were made to recover and splice the broken ends. A new two-conductor cable, 7 miles long, was laid across Vineyard Sound from Gay Head to Pasque Island during the latter part of June, 1888, which, together with 2 miles of one-conductor cable and a new double-wire land line from Pasque Island to Wood's Holl, furnishes now two separate circuits between Martha's Vineyard and the Western Union lines at Wood's Holl, and will be able to accommodate the heavy summer business, which exceeds the capacity of a one-wire line. The new cable having been laid where vessels rarely if ever anchor, is expected to be comparatively safe from the great liability to damage, which rendered the old cable a frequent source of trouble and expense. On Nantucket the line was extended from Saukaty Head light-house, via the Coskata life-saving station, to Great Point light-house, a distance of 9 miles, and a display station established at that important point. Five hundred new wooden poles were set up on the islands, replacing an equal number of iron ones, and it is proposed to gradually put the entire line on wooden poles, as iron poles are found to be less suitable for these lines.

The expenses on account of repairs amounted to about $2,600, due mainly to breaks in the Vineyard Sound cable and the substitution of wooden for iron poles. The "this line" receipts of the entire Nantucket system during the year were $1,232.16.

The cable connecting Block Island with the main-land was damaged by the going to pieces of a stranded vessel during the severe storm of March 11 to 12, 1888, and a piece of new cable had to be spliced on to make proper repairs. The section is now in good condition. The Block Island line is valuable to shipping and commercial interests, though in a less degree than the Nantucket system. It is of little value for military purposes and present military exigences. Total expense for line repairs about $900; total "this line" receipts, $341.30.

The line from Titusville, Fla., to Jupiter, Fla., 130 miles long, was built under the act approved February 17, 1887, and was put in operation January 13, 1888. It follows the western shore of the Indian River, and acts as a large factor in the rapid settlement of that region. It permits large numbers of people to winter along this river without being beyond the reach of the telegraph, which formerly prevented any great influx of visitors to a section suitable in a rare degree for winter health resorts. Its value for meteorological work is far overshadowed by the cost of maintaining it, and it has no present military use. It, however, gives the life-saving and light-house stations at Jupiter communication with the outer world; and as the operators report to the New York Maritime Exchange all vessels in the West Indian and Gulf trades that pass the station, the real value of the line lies in vessel reports. The line, being new, has cost but little for repairs so far. Total "this line" receipts since January, $324.46.

The Wilmington-Southport line permits of the display of storm-warnings at Southport, and the operator at that point reports to Wilmington tug and vessel owners and agents the passing in or out of all vessels. Hence this line is only valuable to the shipping interests of that section. The cost of repairs has been very light. Total "this line" receipts, $83.56.

The Hatteras section consists of a line from Norfork, Va., via Cape Henry, to Hatteras Inlet, N. C., with a cable from Cape Henry to Cape Charles. The Cape Henry station reports to Norfolk and Baltimore all passing vessels, and displays storm-warnings; all of which is work of great value to the shipping interests of those cities, but is of no value to the present work of the Signal Service. The line is used in the receipt of weather reports from Hatteras, the display of storm-warnings at that point, and the summoning of aid in the case of wrecks. But in view of the fact that the Life-Saving Service has a telephone line from Hatteras to Cape Henry, with an outlet to the commercial telegraph system at Virginia Beach, the work of reporting marine disasters could as well be performed by that service. Hence the line is of value only for the storm-warnings to, and the weather reports from, Hatteras. This work costs the service 6 men, 3 mules, and all expenses incident to two stations, and about half of the expenses of two others; and as the reports and warnings would hardly be missed if stopped, this seems a heavy price to pay for them. The cable between Capes Henry and Charles connects the telegraph line of the New York, Philadelphia and Norfolk Railroad Company with the Norfolk signal office, and thence by loop with the Norfolk offices of the company; said company operating the Cape Charles end of the line and its own business in Norfolk in exchange for a uniform rate of 5 cents per message, charging this service nothing for operator's services at Cape Charles. This cable is not now, and it is extremely difficult to imagine any circumstances under which it ever could be, of the slightest earthly value to the Government, and to the public it renders no very valuable service. Fortunately, under existing circumstances, the cable costs very little in its maintenance and operation, but the first cost of $13,400 represents a capital on which the United States receives no interest or return of any kind. Why this service should continue to operate this cable when not the flimsiest reasons therefor can be offered, is a question difficult to answer; but in view of the fact that some day severe reflections might be cast on this service for operating a line so manifestly useless, I suggest that the Chief Signal Officer present this, with some other matters I shall mention later on, to higher authority, in order to protect himself and this service from unjust censure.

The "this line" receipts of the Hatteras section during the year amounted to $362.62.

On the Pacific coast the sea-coast service is represented by the Cape Flattery and the Fort Canby sections. The former consists of a line from Tatoosh Island to Port Angeles, Wash., which was built in 1883 by contract, and paid for from the appropriation for the construction, maintenance, and repair of military telegraph lines. A house was built on Tatoosh Island, and three enlisted men of the Signal Corps and two civilians are required to operate and maintain the section. Weather reports from Tatoosh Island are valuable, but bear no fair proportion to the cost of construction or maintenance of the line. Its value, therefore, must be found elsewhere. All vessels passing Tatoosh Island are reported to Port Townsend, Wash., and in this work, and in calling assistance in case of marine disasters, lies the great value of the line. The cable from Tatoosh Island to the main-land parted during a heavy storm in December, 1887, and was repaired during the following March at considerable expense, but will soon have to be replaced by a new one if the section is to be maintained. The cost of line repairs, exclusive of repair-men's salaries, was about $600; receipts, "this line," $32.36.

The Fort Canby section has been practically out of operation since the break in the Columbia River cable in July of 1886, though communication with the display station at Fort Stevens has been maintained throughout the year. All attempts made to repair the cable proved useless, and Congress finally appropriated a sufficient sum for a new one, which is now under way to Astoria, and will probably be laid early in August. The land line on the Washington Territory side of the river will receive extensive repairs at the same time. As Fort Canby was abandoned as a military post during the year, the military necessity for this line has ceased to exist; the weather reports sent over it are valuable; but, like the Tatoosh Island line, its chief value lies in vessel-reporting to Astoria and Portland, Oregon. About 1 mile of the old cable was recovered in March last and stored for use elsewhere. Total expense for repairs, including work on the old cable, about $500; receipts, "this line," 15 cents.

Another Pacific coast line is now under construction, viz, from Point Reyes Light, Cal., to Point Tiburon, a distance of about 50 miles, which will connect at Tiburon with the system of military cables in San Francisco Harbor and with a short new line to the San Francisco signal office. The work of construction is done by contract under the supervision of Lieut. J. A. Swift, Signal Corps, and will be completed some time in August. The remarks made on the usefulness of the Fort Canby and Tatoosh Island lines are applicable to this line also, except that no meteorological observations of value can be had as a result of its construction. It will be of great value to the shipping interests of San Francisco, and may become useful for military purposes; but this is a remote possibility.

To summarize on the sea-coast lines, the lines from Norfolk to Cape Henry, Wilmington to Southport, Titusville to Point Jupiter, Tatoosh Island to Port Angeles,

Fort Canby to Astoria, and Point Reyes to San Francisco are valuable mainly for vessel reports to the various maritime exchanges, but as these exchanges pay the cost of the reports over commercial telegraph lines, the information contained therein is accessible only to members, and it follows that the benefits in this case do not go to the general public, nor to those specially interested unless they happen to be members of these exchanges. The lines are also used incidentally for weather reports (whose value bears nothing like a reasonable comparison with the cost of the lines) and for the very limited amount of commercial business done over them, the receipts from which do not bear a considerable share of their running expenses. These six sections of lines, for which this service has little or no use, are a burden to its appropriations which has seriously embarrassed it in the past; but the wise provisions inserted in the appropriation bill for the current fiscal year relieves it of this, and places the charges against an item of the appropriation to which it properly belongs, so that no money appropriated for the support of meteorological stations will in future be expended in supporting stations necessary only because of the existence of these lines. There is no service rendered by this Bureau to the public that is of greater value than the vessel reports made by the operators on these lines, and no class of the business public acknowledge it with greater readiness than the maritime interests of our seaboard cities. The lines should be fostered for this reason, and extended wherever and whenever practicable, so that vessels approaching our shores will be early reported, and all cases of marine disaster telegraphed so that assistance can be promptly rendered. As, however, at all points near any great harbor, where the amount of shipping is large, this work is performed by private enterprise, it would seem that eventually this work must pass into the hands of private parties; but as long as it is performed as a part of the work of the Weather Bureau, the object and character of the work should always be accurately stated, to the end that Congress and the public may know the purpose for which the lines, and money for their support, are necessary. In my opinion it will be unwise to continue longer the expense connected with the operation of the line from Cape Charles to Hatteras, as the cable to Cape Charles serves neither the Government nor the public, and the line to Hatteras is a partial duplication of the work of the Life-Saving Service. If discontinued, the result would be a saving to the United States without any detriment to the work now done in cases of marine disaster. I therefore recommend that the line from Cape Henry to Hatteras, together with such property as can not be moved for use elsewhere, be wholly transferred to the Life-Saving Service, and the stations at Kitty Hawk and Hatteras closed. If the Life-Saving Service does not want the line all of it should be sold. I am at a loss to say what would be suitable action in the case of the Cape Charles cable; but suggest that if the whole matter were laid before the Secretary of War, and by him before Congress, suitable action might be had that would remove a burden from the appropriation for this service that diverts a portion thereof from more valuable and proper uses.

The Block Island and Nantucket lines are probably the most valuable of all the sea-coast lines, giving as they do telegraphic service to about 75,000 people during the hot months, and at the same time sending valuable vessel reports, but they render little service of value in weather work. As all of these lines were constructed in consequence of legislation based almost wholly on the alleged necessity for weather reports from, or storm-signal displays at, their extremities, the real reasons (*i. e.* vessel reports and telegraphic communication for localities having so sparse a population as to preclude paying commercial lines) being kept somewhat in the background, it is recommended that these facts be presented to Congress with the annual estimates, and that each line be estimated for separately, to the end that Congress may decide (having all the facts before it) as to their continuance by making a very specific appropriation for their support, or none at all. This action would in no way embarrass the work of the Weather Bureau, and preclude the possibility of any one charging this service with anything but the most straight forward and business-like methods.

MILITARY TELEGRAPH LINES PROPER.

Department of Dakota.—Fort Totten-Lakota section, 42 miles long. This line originally extended to Larimore, 75 miles from Fort Totten, but with the advance of the railroad it was shortened 32 miles. Devil's Lake City, on the north side of Devil's Lake, would be the proper terminus for this line, as it handles most of the freight and other business for the post; but as this would require a considerable extension of the line, and as the greater portion of the line from Fort Totten to Stump Lake is in need of extensive repairs, it would seem wise to build a new line from the post to Totten Station, 10 miles distant on the Jamestown Branch of the Northern Pacific Railroad, where connection can be made with the commercial line to Minnewaukon, on the western end of Devil's Lake. Then by the use of telephones the necessity for a Signal Corps man at Fort Totten would cease to exist. I recommend that action be taken to build this line, and then transfer the whole of it to the acting signal officer at Fort

Totten, this service continuing to furnish all line supplies that may be needed at any time, but the post authorities caring for its operation. There would be, in my opinion, no difficulty attending such action, as the railroad operator at Totten Station would attend to the telephone at that end of the line, and commercial business would be discontinued. As the amount of business is exceedingly small compared to the cost of maintaining the present line, this arrangement would be the most economical to the Government, and beyond question satisfactory to the post and department authorities. The Western Union authorities have already signified their willingness to have their operator at Totten Station attend to that end of the line free of charge. The "this line" receipts of the section during the year amounted to only $7.23.

Fort Sisseton-Webster section, 30 miles long: This line is maintained as recommended above for the Fort Totten section, except that this service pays $20 per month to the Western Union operator at Webster for his services in attending to the telephone. This is, in my opinion, an unnecessary expense, as, had proper steps been originally taken in the matter, the services could have been secured gratis. The sum is excessive for the amount of work required, but I doubt if any action can be taken now that will alter the status to what it should be.

Bismarck-Fort Yates section, 55 miles long: This line, connecting the posts of Fort Abraham Lincoln and Fort Yates with Bismarck, was during the year placed on the poles of the telegraph and telephone companies from Bismarck, via Mandan, to Fort Abraham Lincoln, as the Signal Service poles were swept away by the flood of March, 1887. The post of Fort Abraham Lincoln has not been furnished an operator by this service, but has until recently detailed an enlisted man from one of the companies stationed there for that duty. Recently a request was made for a Signal Corps man, which could not be complied with; but I hope during the present year we will be able to send one, as this is an important post, and while we maintain the line we should furnish the operator. The "this line" receipts of the section were $150.28.

The Western Union line from Fort Sully to Pierre, Dak., is operated by the Signal Corps observer stationed at the post, and kept in repair by troops. So far this arrangement has given satisfaction to all concerned.

Fort Maginnis section, 232 miles long: Owing to the extension of the railroad this section was shortened 135 miles during the year, so that it now extends only from Fort Maginnis to Poplar River, instead to Fort Buford and Glendive as formerly. It was my intention to recommend the closing of Poplar River Station and the building of a short piece of line from the present line to the railroad at the forty-third siding, but this action was impracticable, owing to the need of an operator at the post of Poplar River; the railroad office being a mile and one-half therefrom. Should the rumors of the contemplated abandonment of Fort Maginnis and Camp Poplar River prove true, this section can be sold and a heavy expense saved thereby, as there will then be no necessity for a station at either point, nor for the two civilian repair-men at Galpin, who cost this service $1,680 per year in salaries alone. The section is in fair condition only, and will need a general overhauling and some new poles before winter. "This line" receipts, $155.17.

The Fort Custer-Custer Station section is 30 miles long, and in good condition. The Custer Station office is operated by the Western Union operator at an expense of $25 per month, which expense could be avoided if the quartermaster's agent there could do the work, but this is doubtful. "This line" receipts, $106.22.

Department of the Missouri.—The lines in this department, together with the lines in Texas and New Mexico, are in the charge of Second Lieut. J. H. Weber, Signal Corps, stationed at San Antonio, Tex. They comprise the following sections, viz: The Indian Territory section, 198 miles long, and the Fort Elliott section, 17 miles long. In addition to these there are two short lines connecting Forts Lewis and Crawford with the nearest railroad stations, and which are operated as telephone lines under the control of the post authorities. The Fort Lewis line costs this service $30 per month for services of telephone operator at Durango, 15 miles from the post, which sum is exorbitant but can not be reduced under the present arrangement. It is recommended that this line be turned over entirely to the post authorities, this service to furnish supplies only. The said authorities could no doubt arrange to have the line operated free of charge at Durango. No commercial business is done over the Fort Lewis and the Fort Crawford sections.

The Indian Territory section extends from Fort Supply, via Fort Reno, to Fort Sill, and affords these important posts a telegraphic outlet at Woodward, 15 miles south of Fort Supply, on the Southern Kansas Railroad.

From present indications it is presumed that a railroad and telegraph line will reach Forts Reno and Sill before another year, when all but the 15 miles from Fort Supply to Woodward can be abandoned. Ninety-five miles of line formerly belonging to this section was abandoned on January 1, 1888, owing to the construction of the new line from Fort Elliott to Miami, Tex., as mentioned further on. The section is kept in efficient repair by troops from the several posts, in charge of the general repair-man, stationed at Cantonment. Receipts "this line," $211.50.

The Fort Elliott section was built during December, 1887, in consequence of the extension of the Southern Kansas Railroad to a point within 17 miles of the post. We were thereby enabled to abandon 95 miles of line between Fort Elliott and Fort Supply, and as the new line was built of old material and by the labor of troops, no expense was incurred; while the abandonment of the line to Fort Supply saved considerable expense on account of repairs. "This line" receipts, $111.81.

Civilians are employed at Woodward and Miami at $30 per month each, and a general repair-man at Cantonment at $75 per month; all of which is necessary and reasonable.

Department of the Platte.—The lines in this department are the Fort Bridger section, 10 miles; the Fort Washakie section, 152 miles; the Fort McKinney section, 51 miles; the Fort Du Chesne section, 87 miles; and Fort Robinson section, 75 miles.

The Fort Bridger section will soon be made a telephone line, and the necessity of keeping a Signal Corps man at the post will then cease to exist. The civilian operator at Carter receives a salary of $25 per month, an amount in excess of a fair compensation, as the work is very light; but it is impossible to get it done for less unless the post authorities can arrange the matter after the line is turned over to them. "This line" receipts, $22.61.

Fort Washkakie section: This line, with the approval of the War Department, was leased from the Western Union Telegraph Company for the nominal sum of $1 per annum, and was placed in thorough repair by troops from the post during the past autumn; this service furnishing a large amount of material and iron poles, also an officer and non-commissioned officer to supervise the work. It is a very important line and a costly one, two civilians being employed on it at an aggregate salary of $115 per month; but as important meteorological reports are obtained, and a line is maintained which the General of the Army has stated to be a military necessity, the result justifies the cost, which is as low as can reasonably be expected. "This line" receipts, $87.02.

The Fort McKinney section, from Fort McKinney to Powder River, was originally built by the Quartermaster's Department to connect said post with a commercial line. In July last, at the instance of the War Department, this service assumed charge of the line, put it in good repair, and by an arrangement with the Wyoming Inland Telegraph Company has operated it since September 10, 1887. It is of great importance, and as a present arrangement, by which we obtain the necessary operating services and also meteorological reports at the small expense of $60 per month, gives satisfaction, I recommend that it be continued. Line recepts, $173.95.

The Fort Du Chesne section was completed during last September, and connects that important post with the railroad station at Price, Utah. It was built by the labor of troops, this service furnishing the line material and an expert lineman. A signal operator is stationed at the post and a Signal Corps repair-man at Brock's Ranch, near the center of the line, while a civilian transfer operator is employed at Price at a salary of $30 per month. A civilian can also be employed to manage the repair station at Brock's Ranch for the low figure of $30 per month, but the reduced appropriation will hardly admit of this during the coming fiscal year. The section is reported to be in good condition at present. Line receipts, $111.31.

The Fort Robinson section furnishes a telegraphic outlet for the post of Fort Laramie via the railroad office at Fort Robinson. It is in fair condition only, owing to decaying poles, but as it is expected that the railroad will reach Fort Laramie before another year, it is not advisable to undertake very extensive repairs. A Signal Corps operator is stationed at each post. Receipts "this line," $27.21.

Department of Texas and District of New Mexico.—As mentioned before, the lines in this department and district are in charge of Lieutenant Weber, at San Antonio. There are only two sections left in Texas, namely, the Brownsville section, 100 miles, and the Fort Davis section, 22 miles. In addition to these, a short loop connects department headquarters at San Antonio with the Western Union office, which is operated by the observer. In New Mexico are the Fort Stanton section, 108 miles; the Fort Union section, 9 miles, and the Fort Wingate section, 3 miles. The last two lines are operated with telephones and carry no commercial business, but the Fort Union section costs us $15 per month for services of operator at Watrous, which should be stopped.

The Brownsville section is a very important military line, as it furnishes the only means of telegraphic communication with Fort Ringgold and a section of country much infested by outlaws and all classes of criminals, whose capture is materially aided by the use of this line. Signal Corps operators are stationed at Fort Ringgold and Brownsville, and a civilian at $30 per month at each of the subposts of Santa Maria and Edinburgh. The entire line is on iron poles, but has recently been much damaged by floods and washouts, and it is proposed to reconstruct it along a better route during the coming fall. Receipts "this line," $459.89.

The Fort Davis section is also on iron poles, and is in excellent repair. The transfer operator at Marfa costs this service $40 per month, which is exorbitant but un-

avoidable at present. It is believed that the same plan recommended for the Forts Totten, Bridger, and Lewis sections can be put in operation here with success; but only the very best telephone service will answer for this important post. Receipts "this line," $65.32.

The Fort Stanton section is largely on iron poles and is maintained in very efficient condition. It connects an important post with the commercial lines at Lava, and affords telegraphic facilities to several settlements in the vicinity. It is operated by the Signal-Corps men at Fort Stanton and Lava. The employment of a civilian at Lava, at a salary of $35 per month, has been suggested in place of the enlisted man, but as there would be no increased efficiency, such action is not recommended at present. Receipts "this line," $117.84.

Department of the Columbia.—Second Lieut. James A. Swift, Signal Corps, assumed charge of the lines in this department in September last, and has also been engaged in supervising the construction of the Point Reyes line since May of the present year. The lines aggregate 341 miles, in sections as follows: The Fort Klamath section, 233 miles, extends from Fort Bidwell, via Lakeview and Bly, to Fort Klamath, and thence via Linkville to the transfer office at Ashland, where the officer in charge is stationed. It was built in 1882-'83, the poles being cut by troops and put up green. The result has been that for the past two years constant interruptions have occurred, due to rotting poles. The line, in order to render anything like efficient service, will have to be almost entirely rebuilt; but as it is understood that the post of Fort Bidwell is to be abandoned soon, none but the most necessary and inexpensive repairs should be made between this post and Fort Klamath. Three hundred new wooden poles are now being erected between Fort Klamath and Ashland, but this will be a very temporary and slight relief, and as the next appropriation will not admit of a larger expense, if of any at all, I recommend that a special estimate of $3,000 be submitted to rebuild that portion of the line, and that the matter be urged as one of importance. It will require every cent of this amount to put the line from Fort Klamath to Ashland in first-class condition, and should go in as a deficiency estimate. Receipts "this line," $938.38.

The Fort Canby section, 28 miles, and the Cape Flattery section, 80 miles, have already been described and commented upon under sea-coast lines. The Fort Spokane section, 61 miles, was sold in September last to a private company which had offered to purchase and operate it.

Department of California.—The only military line in this department is the system of cables and land lines connecting the Presidio of San Francisco and Fort Winfield Scott with the military posts on Alcatraz and Angel Islands. The submarine cable from Fort Mason to Alcatraz, which was repaired in December of last year at a cost of $350, was again broken by an anchor in the following March, and left in such bad condition as to render further repairs impossible. A piece of spare cable has been ordered shipped from Astoria, and the department commander has promised the aid of the Government tug and prison labor in laying it. The line is operated by the military authorities without expense to us, but has been a very heavy expense to this service on account of the frequent and costly repairs to the Alcatraz cable. If an appropriation could be secured for a cable across the Golden Gate, and thence by land line to Point Tiburon, it would not only provide a safe means of communication with the islands named, but would furnish the best possible connection for the terminus of the Point Reyes line at Tiburon with the signal office at San Francisco.

Department of Arizona.—The telegraph lines in this department have rendered in a military sense far greater service in the past few years than any other lines owned by the Government. The Prescott section, 197 miles, from Fort Verde, via Whipple Barracks and Phœnix, to Fort McDowell, with outlets to commercial lines at Prescott and Phœnix; and the Fort Apache section, 216 miles, from Fort Apache, via Fort Thomas, San Carlos Indian Agency, Fort Grant and Willcox, to Fort Bowie, with an outlet at Willcox, have rendered the service mentioned during the last Apache campaigns. The service has been efficient and satisfactory to the department commander, General Miles, but he has asked for a second outlet to the Apache section on the ground of increased efficiency. There can be no question but that this request should be complied with had this service adequate means to do so; but so far favorable action has been impossible. Owing to the extension of the railroad to Phœnix, 30 miles of line was abandoned between that point and Maricopa in July of last year, and the department commander was asked to consent to the abandonment of the section from Phœnix to Prescott, but this was declined on the ground of military necessity, which doubtless far outweighs considerations of the increased expense from the employment of two civilians at an aggregate expense of $1,200 annually, and the two Signal Corps men who would have become available had our request been favorably considered. In view of General Miles's wishes it is recommended that a special effort be made to furnish sufficient material to build a line from Fort Apache to Holbrook on the Atlantic and Pacific Railroad; or, from San Carlos to Fort McDowell, which alternative is, in my opinion, a far better solution of

the question than the original proposition. I believe we could gather together enough old material to build this line, about 60 miles, and hope that this action will be taken in the near future. It would not cause any increased expense, and the troops could build it. It has been suggested that as a civilian could be employed at Willcox at $40 per month, it would be in the interest of economy to have him replace the enlisted operator, but it is doubtful if the appropriation would admit of it, and no present necessity exists for the change.

The telephone line from Fort Huachuca to Huachuca Station, 7 miles, being no longer used, was sold at auction last April Another telephone line in this department, viz, from Fort Lowell to Tucson, 7 miles, costs this service $50 per year for rent of telephones and services.

The lines in the Department of Arizona have continued to be in charge of Second Lieut. W. A. Glassford, Signal Corps, stationed at Whipple Barracks, except those in the district of New Mexico, as before mentioned.

"This line" receipts of the Apache section, $598.78; of the Prescott section, $828.32.

To recapitulate: If the foregoing recommendations relative to the Forts Totten, Bridger, and Davis sections can be carried out, three men will be saved, three stations of small value abandoned, and an expense of $780 a year in salaries avoided; and if those for Forts Sisseton, Custer, Lewis, and Union can be executed, a reduction of $1,080 per year will be the result. A man at Brock's Ranch and one at Willcox can be replaced for $360 and $480 per year, respectively. A further saving can be made at Woodward and Miami by the adoption of the same plan recommended for Forts Bridger, Custer, etc., but this can not be put in operation at Woodward while the line south of that point remains in operation. The plan of replacing paid employés by men without pay looks at first glance like an impossibility, but when it is considered that the Quartermaster's Department has at each of the points named a paid employé, and that each of the said lines will use telephones where skilled operators are unnecessary, the matter becomes easy, but will require the approval of and action by the War Department. At such of these points where the Quartermaster's Department may have no employés, the Western Union or railroad officials can be secured by application to the proper authorities of the companies, as noted above in the case of the Fort Totten section. The saving brought about by this action can be used in the repairs of the Fort Klamath and other important sections that stand in need of it, thus adding greatly to their efficiency and performing the work expected of us by both Congress and the War Department. With the exception of the line suggested in Arizona from San Carlos to Fort McDowell, and the line to Totten Station, no new lines can possibly be built during the coming fiscal year.

The following statement shows the number of miles of military and sea-coast lines in operation on July 1, 1888, in each department; the expenditures incurred during the past year, approximately, in the maintenance, operation, and repair of the lines; and their earnings on account of commercial business transacted over them, viz:

	Miles.
Department of Dakota	382
Department of the Missouri	239
Department of Texas	124
Department of the Columbia	341
Department of California	12
Department of Arizona	540
Department of the Platte	375
Department of the East	453
Total	2,466

Expenditures.

Rents of offices	$1,700.00
Salaries of civilian employés	12,600.00
Line repairs	5,400.00
Line material	4,800.00
Battery material	1,400.00
Instruments and tools	600.00
Stationery	600.00
Telephones	300.00
Lights	400.00
Incidentals	2,200.00
Total	30,000.00
Total "this line" receipts	6,564.36

The work of the telegraph division of this office has consisted during the year in handling all correspondence on telegraph business, auditing all bills for telegraphic services rendered by commercial companies and for line repairs, recommending the action taken on all expenditures of any character relative to telegraph lines, preparing all specifications for materials, cables, etc., and in a word supervising the telegraph work of the service. The clerk, Sergeant Robert Seyboth, has been on this duty, while eight operators have performed the work of the telegraph room. These men have performed their duties faithfully and efficiently.

One million and twenty-one thousand cipher words (weather reports) and 70,000 telegrams, other than cipher reports, were sent from and received at this office during the year. One hundred and seventy-nine bills of telegraph companies for services rendered were audited, and abstracts prepared for a period of six months, showing in detail the number of words sent and received over circuits wholly or in part made up of subsidized lines. The new telegraph cipher code, devised by the Chief Signal Officer, was used during the year, and proved entirely satisfactory. Its use resulted in a saving to the Government.

For temporary convenience of administration the telegraph division was merged into the stations division by instructions No. 48, of 1887, but was re-established as a separate division on July 1, 1888.

Respectfully submitted.

F. R. DAY,
Second Lieutenant, Signal Corps, Telegraph Officer.

APPENDIX No. 9.

REPORT OF THE OFFICER IN CHARGE OF THE CORRESPONDENCE DIVISION.

SIGNAL OFFICE, WAR DEPARTMENT,
Washington City, June 30, 1888.

SIR: I have the honor to submit the report of the correspondence division for the year ending June 30, 1888.

Second Lieut. James Mitchell, Signal Corps, was in charge of the division to June 1, 1888, when Second Lieut. Frank W. Ellis, Signal Corps, assumed charge.

This division, the headquarters or adjutant's office of the service, issues general and special orders, circulars, and instructions; secures transportation for the movements of the enlisted men; conducts correspondence with, and the educational examination of candidates for enlistment, the correspondence relative to the enlistment, re-enlistment, discharge, furlough, and leave of absence of the men of the service, and the general correspondence of the Bureau on matters with which none of the other divisions are charged; records and copies, mails, etc., the letters received and sent, respectively, of the stations division; and reports upon the applications for pension by the men of the Signal Corps during the war. These duties have been performed more expeditiously than usual and with a decreased clerical force, the number of clerks on duty in the division at the beginning of the fiscal year being fifteen and at the close eleven. This reduction was accomplished by changing the old and cumbersome methods, which absorbed too large a part of the time of the clerical force. Some of these methods appeared to have no other result than to take up the time of the clerks. This was especially noticeable in the handling of the letters coming into the Bureau, of which there is an enormous number annually, and each of which, the unimportant no less than the important, had, under the old system, to be carefully briefed and the brief copied into a book of record. Except in the case of matters of some moment, this briefing and recording of "letters received" has been dispensed with; the change not only resulting in less labor, but allowing earlier action to be had in each case. Many changes have been made in other divisions to the same end, such as dividing the books of "letters sent" into series, with reference to their contents, thus obviating the necessity of indexing subjects; the use of skeleton letter-forms, on which all that can be is printed, thus reducing to a minimum the amount of writing necessary; the discontinuance of the practice of sending letters of transmittal with checks, of which many hundreds were formerly mailed monthly; the discontinuance of letters acknowledging receipt of orders, circulars, etc., of which about 20,000 were received annually. It is believed that much can yet be accomplished, especially in other divisions of the office, by the adoption of simpler methods, but it is not considered advisable to suggest any changes at present, in view of the fact that the War Department board now considering this general subject will probably soon report its conclusions, when the Secretary of War will no doubt promulgate instructions for the several bureaus. When this Bureau has removed to its new quarters, which will be at an early date, opportunity will be presented, by the proximity of the now scattered divisions and the consequent facility of intercommunication, for improvements in the performance of the clerical work, such as the consolidation of the several divisions now keeping independent sets of letters received and sent.

The daily report of work made by each clerk to the chief clerk, required by War Department orders published in 1887, has been kept up during the year. The time expended in this may be said to be equivalent to that of two clerks daily, an expenditure of time which does not seem to be counterbalanced by any good effect.

Inclosed herewith are the following lists, in duplicate:

Stations inspected during the year. (For this list see Appendix No. 7.)

Names of places at which the establishment, etc., of stations was requested but not favorably considered.

Names of meterological committees of boards of trade, chambers of commerce, etc., which were in communication with the Chief Signal Officer during the year.

The following is the number of communications, etc., sent from and received in all the divisions of this office during the year:

Communications received, including inclosures and meteorological forms	314,871
Communications sent, including orders, etc., distributed	159,751
Bulletins, weather maps, annual reports, and other publications distributed from Washington	214,277
Total	688,899
Telegrams:	
Cipher words of reports sent and received	1,021,000
Telegrams other than weather reports sent and received	70,000

I am, very respectfully, your obedient servant,

FRANK W. ELLIS,
Second Lieutenant, Signal Corps, Assistant and Adjutant.

The CHIEF SIGNAL OFFICER.

List of boards of trade, chambers of commerce, and other organizations which had, during fiscal year ending June 30, 1888, meteorological committees conferring with the Chief Signal Officer of the Army.

Place.	Name of organization.	Committees.
Alpena, Mich	Board of Underwriters	Henry S. Seage, John N. Kelley, J. D. Holmes, B. F. Luce, Chas. H. Luce.
Augusta, Ga	Augusta Cotton Exchange	W. F. Alexander, L. A. Adams, W. J. Craig.
Bismarck, Dak	Chamber of Commerce	F. A. Leavenworth, A. D. Gray, E. L. Faunce.
Block Island, R. I		B. B. Mitchell, Ray S. Littlefield, Chas. E. Perry.
Buffalo, N. Y	Merchants' Exchange	Nathan C. Simons, Frank W. Fiske, Chas. H. Arthur.
Charleston, S. C	Chamber of Commerce	L. D. DeSaussure, J. L. Sheppard, S. V. Stewart.
Do	Merchants' Exchange	Geo. W. Bell, T. Follett Ware, John Dougherty.
Charlotte, N. C	Chamber of Commerce	T. F. Drayton, S. A. Cohen, W. W. Flemming.
Chattanooga, Tenn	do	Dr. J. W. Bachman, J. B. Nicklin, Hugh Whiteside, D. B. Loveman, J. F. Loomis.
Cleveland, Ohio	Board of Trade	R. K. Winslow, chairman; R. T. Lyon, Capt. W. B. Guyles.
Concordia, Kans		B. H. McEkron, Theo. Laing, Prof. T. A. Sawhill.
Detroit, Mich	Board of Trade	T. G. Craig, J. M. Jamison, C. W. Baird.
Duluth, Minn	do	W. Van Brunt, E. A. Gilbert, O. C. Hartman.
Erie, Pa	do	J. J. Wadsworth, H. S. Jones, Geo. Platt.
Galveston, Tex	Cotton Exchange (committee on information and statistics).	F. Lainsners, H. Drier, R. Bornefield, G. Heyl, R. B. Hawley.
Grand Haven, Mich		Hon. Dwight Cutler, T. W. Kirby, G. W. A. Smith.
Jacksonville, Fla	Jacksonville Board of Trade	Dr. A. S. Baldwin, Reed, Clark, Bower, Fuerlie.
Keokuk, Iowa	Young Men's Business Association.	J. B. Weil, A. E. Matless, Arthur Moody.
La Crosse, Wis	Board of Trade	D. A. McDonald, John Rau, J. H. Sieman.
Los Angeles, Cal	Los Angeles Board of Trade	Eugene Germain, Vinton L. Mitchell, W. A. Clinton.
Louisville, Ky	Polytechnic Society	E. A. Grant, James L. Howe, Laf Joseph, E. H. Mark.
Montgomery, Ala	Cotton Exchange	Jno. W. Durr, J. D. Beals, F. M. Fisk.
Norfolk, Va	Norfolk and Portsmouth Cotton Exchange.	John N. Vaughn, Adam Tredwell.
Northfield, Vt	Board of Trustees	Dr. Geo. Nichols, Hiram Atkins, Dr. Wm. B. Mayo.
Pensacola, Fla	Board of Trade and Exchange.	S. C. Cobb, H. Barrs, J. M. Tarbel.
Portland, Me	Board of Trade	Cyrus H. Farley, M. N. Rich, William Senter.
Portland, Oregon	Chamber of Commerce and Board of Trade.	Rev. Dr. Geo. H. Atkinson, E. H. Page, Geo. H. Himes.
Rapid City, Dak	Board of Trade	G. E. Bailey, V. T. McGillicuddy J. R. Brennan, O. L. Cooper, W. H. Mitchell.
San Diego, Cal	Society of Natural History	Dr. G. W. Barnes, Dr. H. W. Gould, C. J. Fox.
Sandusky, Ohio	City Council	J. C. Estes, R. E. Schuck, Chas. H. Moss.
Savannah, Ga	Savannah Cotton Exchange	C. M. Holst, A. L. Hartridge, J. J. Wilder.
Saint Louis, Mo	Merchants' Exchange	Isaac M. Mason, R. E. M. Bain, Wallace Delafield, John Bird, Conrad Fink, Thos. H. Ward, H. M. Blossom.
Springfield, Ill	City	Frank Fleury, Prof. J. H. Collins, H. W. Clendenin, Geo. S. Connolly, Wm. Ridgley, R. B. Hoover, Jno. M. Garland, G. S. Dana.
Wilmington, N. C	Chamber of Commerce	F. W. Kerchner, Wm. L. Derosett, Geo. Harriss.

List of places for which stations have been requested during fiscal year, but not established to June 30, 1888.

California:
- Mount Hamilton, January 2, 1888.
- Riverside, April 14, 1888.

Dakota:
- Miles City, January 4, 1888.
- Sioux Falls, March 3, 1888.

Florida:
- Sand Key, January 16, 1888.

Georgia:
- Macon, May 17, 1888.

Illinois:
- Makanda, March 8, 1888.

Iowa:
- Council Bluffs, February 27, 1888.
- Grinnell, February 7, 1888.

Kansas:
- Wilson, December 30, 1887.

Kentucky:
- Franklin, April 1, 1888.
- Warfield, August 22, 1887.

Maryland:
- Cove Point, November 28, 1887.

Missouri:
- Cape Girardeau, March 21, 1888.
- Chillicothe, December 13, 1887.
- Doniphan, April 9, 1888.
- Glasgow, March 9, 1888.
- Louisiana, June 25, 1888.

New Mexico:
- Las Vegas, February 20, 1888.

New York:
- Point Petef, January 21, 1888.

Pennsylvania:
- Lewisburgh, September 30, 1887.
- Nopsonock, February 18, 1888.
- Philipsburgh, December, 13, 1887.

Texas:
- Cuero, April 7, 1888.

Wyoming:
- Douglas, November 1, 1887.

APPENDIX No. 10.

REPORT OF THE OFFICER IN CHARGE OF STATIONS DIVISION.

SIGNAL OFFICE, WAR DEPARTMENT,
Washington, June 30, 1888.

SIR: I have the honor to submit the following report of the operations of the stations division of this office for the year ending this day. A separate report of the telegraph work will be made.

As the duties performed and the work supervised by this division have been given in detail in previous reports, a repetition will not be necessary here. They have continued to increase in importance and volume.

No material changes have been made in the number of special river, special display, special cotton-region, and special rain-fall stations during the year. An increase was impossible, and careful judgment and strict economy were necessary to carry on the branch systems without interruption to the end of the year and to prevent financial embarrassment.

Such changes as have been made in substations have resulted from a close study of the needs of the communities, as represented by the local interests.

Stations have been established and discontinued as follows:

Station.	Date.
Second order.	
Opened:	
Fort Washakie, Wyo	July 5
Fort McKinney, Wyo	Do.
Carson City, Nev	Aug. 1
Fresno City, Cal	July 26
Springfield, Mo	July 1
Lexington, Ky	Do.
New Brunswick, N. J	Do.
Titusville, Fla	Do.
Colorado Springs, Colo	Do.
Crete, Nebr	Do.
Fort Du Chesne, Utah	Sept. 1
Rapid City, Dak	Jan. 1
Jupiter, Fla	Do.
Closed:	
Mount Washington, N. H*	Sept. 30
Chincoteague, Va	July 1
Sitka, Alaska	Sept. 30
Deadwood, Dak	Dec. 31
University, Miss	Mar. 31
Frisco, Utah	Jan. 1
Fort Apache, Ariz	Mar. 31
Escanaba, Mich	Do.
Mackinaw City, Mich	Do.
Las Animas, Colo	May 31
To be opened, 1888:	
Sault de Ste. Marie, Mich	July 1
Pueblo, Colo	Do.
Manistee, Mich	Do.
Harrisburg, Pa	Do.
Wichita, Kans	Do.
Kansas City, Mo	Do.
Parkersburgh, W. Va	Do.
Third order.	
Opened:	
Brook's Ranch, Utah	Nov. 11
Sebastian, Fla	Jan. 31
Chicamicomico, N. C	Do.
Fort Robinson, Nebr	Do.
Fort Stevens, Oregon	Do.
Auburn, Ala	Feb. 1
Fort Apache, Ariz	Apr. 1
Escanaba, Mich	Do.
University, Miss	Do.

Station.	Date.
Third order—Continued.	
Closed:	
Maricopa, Ariz	July 26
Fort Spokane, Wash	Aug. 8
Cape Henlopen, Del	July 1
Ocean City, Md	Do.
Phœnix, Ariz	July 26
Chicamicomico, N. C	May 1
Edgartown, Mass	June 1
Wash Woods, N. C	May 1
River.	
Opened:	
Sioux City, Iowa	July 1
Madison, Ark	Do.
River.	
Opened:	
Frankfort, Ky	July 1
Portsmouth, Ohio	Do.
Zanesville, Ohio	Do.
Gallipolis, Ohio	Do.
Circleville, Ohio	Do.
Charleston, W. Va	Do.
Hinton, W. Va	Do.
Catlettsburgh, Ky	Do.
Louisa, Ky	Do.
Falmouth, Ky	Do.
Manhattan, Kans	Aug. 10
Closed:	
Colusa, Cal	Nov. 3
Folsom City, Cal	Do.
Marysville, Cal	Do.
Oroville, Cal	Do.
Bayou Sara, La	Nov. 15
Kansas City, Mo	June 30
Cotton region.	
Opened:	
Cuero, Tex†	May 1
Cheneyville, La†	Do.
Coushatta Chute, La†	June 1
Closed:	
Cuero, Tex†	Nov. 20
Cheneyville, La†	Do.
Coushatta Chute, La†	Do.

*Re-opened June 15.

†Re-opened.

Station.	Date.	Station.	Date.
Cotton region—Continued.		*Display.*	
Closed: Continued.		Opened:	
Birmingham, Ala	Sept. 14	Delaware Breakwater, Del	July 1
Austin, Tex	Nov. 29	Apalachicola, Fla†	Sept. 1
Calera, Ala	Do.	Port Lavaca, Tex	Oct. 3
Grenada, Miss	Do.	Bristol, R. I	Nov. 1
Magnolia, Ark	Do.	Glen Haven, Mich	May 1
Weimar, Tex	Do.	Mackinaw City, Mich	Apr. 1
Anderson, S. C	Dec. 22	Great Point, Mass	June 1
Greenville, Ala	Do.	Highland Beach, N. J	May 21
Kensett, Ark	Do.	Closed:	
Paris, Tenn	Do.	Saint Augustine, Fla	Jan. 1
Salisbury, N. C	Do.	Cedar Tree Neck, Mass	May 16
Yemassee, S. C	Do.	Manistee, Mich	June 30
Opelousas, La	Feb. 11		
Arkansas City, Ark	May 5		

†Service interrupted September 1.

DAILY INDICATIONS—WEATHER SIGNALS—COLD-WAVE SIGNAL.

About 1,100 cities and towns outside of Washington City have been furnished with the daily indications by telegraph or telephone, at the expense of this service. Six hundred and twenty-five new display points have been established, and 90 discontinued for various reasons, principally for failure to properly display the signals.

As a means of obtaining a general expression as to the value of the weather signals, and for the purpose of ascertaining the names of places at which the reports were not used, a letter was sent on June 1, 1888, to all stations, requesting that they inform the Chief Signal Officer, on or before June 25, 1888, of any special reasons why the reports furnished should be continued, as it was deemed but just that special causes should receive due consideration in case a reduction should be made.

The very large number of replies received to the foregoing letter indicates that the interest manifested in the weather signals is very considerable, and demonstrates to a certainty that this manner of disseminating weather reports is exceedingly popular.

Each weather-signal displayman receiving the indications and cold-wave warnings at Government expense has been furnished with a supply of monthly forms, penalty envelopes, circulars for general distribution, and a copy of the letter setting forth the conditions on which telegrams of weather predictions are furnished.

Numerous letters having been received inquiring as to the number and kind of flags to be displayed under certain conditions, a printed circular illustrating displays, when double predictions are received, was mailed, on May 1, to each displayman for his information.

At the beginning of the fiscal year a number of stations had not been designated to display the cold-wave signal, but at the approach of winter, upon the urgent request of the business interests of the sections covered, others were added to the list, so that now there are but few second-order st ations which do not display this popular signa when necessity requires.

It became necessary, early in the year, owing to the large increase in the number of places furnished with the indications and cold-wave warnings, in order to secure greater efficiency of service and more speedy delivery of messages, to select central points as centers from which the weather messages could be sent.

The following have been authorized and still continue as distributing centers.

Boston, Mass.—For the New England States.

New York City.—For New York State, and convenient points in northern New Jersey, Pennsylvania, and western Connecticut.

Philadelphia, Pa.—For New Jersey and eastern Pennsylvania.

Columbus, Ohio.—For Ohio, northern Kentucky and western part of West Virginia.

Detroit, Mich.—For lower Michigan and northwestern Ohio.

Chicago, Ill.—For southwestern Michigan, northern Illinois, southern Wisconsin, eastern Iowa.

Saint Paul, Minn.—For Minnesota, western Wisconsin, and eastern Dakota.

Omaha, Nebr.—For Nebraska and western Iowa.

Saint Louis, Mo.—For Kansas, Missouri, and southern Illinois.

Indianapolis, Ind.—For Indiana.

Nashville, Tenn.—For Tennessee and southern Kentucky.

Little Rock, Ark.—For Arkansas.

Memphis, Tenn.—For adjacent towns and for Mississippi.

Montgomery, Ala.—For Alabama and western Georgia.

Columbia, S. C.—For South Carolina and eastern Georgia.

Charlotte, N. C.—For North Carolina and southern Virginia.

Jacksonville, Fla.—For Florida and convenient points adjacent.

Denver, Colo.—For convenient points adjacent.
San Francisco, Cal.—For California.
Milwaukee, Wis.—For Wisconsin.
New Orleans, La.—For Louisiana and eastern Texas.
Louisville, Ky.—For Kentucky.
Pittsburgh, Pa.—For western Pennsylvania, eastern Ohio, and northern West Virginia.

An additional advantage is gained from thus grouping the weather reports, that of obtaining telegraphic rates at reduced figures. The cost of telegrams from these centers is as follows: Twenty-five messages, or less, one-half Government rate; over 25 messages and less than 100 messages, one-third Government rate; 100 messages, or over, one-quarter Government rate.

WIND SIGNALS—PAY OF DISPLAYMEN.

In July the "On-shore" signals of this service were discontinued, more than a year's experience having proved this system of signals to be unsatisfactory.

On September 1, the new system of wind signals, devised by the Chief Signal Officer, went into general use at the various cautionary stations of this service, and for the first time signals were used to distinguish between light and severe storms, and to indicate whether the storm center had reached or passed the display station. The new system has given very general satisfaction, and has demonstrated its superiority over that formerly used.

On December 15 the display of signals was discontinued for the season on Lakes Superior, Huron, Erie, Ontario, and Michigan; except at Milwaukee, Wis., and Grand Haven and Ludington, Mich.

Signals were resumed in the spring, as follows: On Lakes Erie and Ontario, on May 1; Lake Huron, on May 10; and on Lakes Michigan and Superior, on May 15.

In order to make the compensation of displaymen commensurate with the duties performed by them, a fixed price has been allowed for each signal displayed, beginning with October 1. Several defects have been found in this plan, and during the next fiscal year a modification will be adopted, by which it will be made as nearly perfect as possible.

The changes in the wind-signal flags and displays necessitated the compilation of a new pamphlet of instructions for displaymen. This was prepared in the fall, and furnished to all displaymen with such other detailed instructions as relate to their particular duties. Copies were also filed with the observers in charge of the section centers.

On January 20, owing to the reduced state of the subappropriation for wind signals, it was deemed advisable to discontinue a number of special-display stations until July 1, when the appropriation for the new year would become available, but, by close watching and rigid economy in expenditures, the Chief Signal Officer was enabled to resume the display on May 1 at all but two of the discontinued stations.

In the interval during which these display stations were closed shipping interests were kept informed as to the occurrence of dangerous winds, and were given such other information as could be furnished. This could be done only as far as the crippled state of the appropriations would admit, and with the understanding that the displaymen would give their aid gratuitously.

WEATHER CROP BULLETIN.

The Crop Bulletin instituted in the last fiscal year has grown in importance and proportions until it is now one of the salient features of the service and furnishes weekly, during the season of vegetation, and monthly during the rest of the year, to all classes of people the weather conditions over the whole United States for the preceding week, month, or season, so that the practical man has no difficulty, from a short study of the Bulletin, in determining with a reasonable degree of certainty, and to his own satisfaction, the weather conditions most likely to prevail in his section during the coming week. By a comparison of the prevailing temperature and rain-fall conditions, with the normal of each, as deduced from many years' observations, the excess or deficiency of temperature and rain-fall since January 1 and during the current week is represented in a tabular bulletin, in addition to the printed Crop Bulletin, so that the farmer, mechanic, and business man find the study of these bulletins an instructive and profitable occupation.

At present over 450 of the printed Crop Bulletins and over 250 of the tabular bulletins are prepared each Sunday, under the personal supervision of the Chief Signal Officer, and sent out in the afternoon mail to every signal station and to other important places in the country, where they are posted in conspicuous places and extensively published for the information and benefit of the public. The various press associa-

tions send these reports over their wires on Sunday evenings and the information appears in hundreds of newspapers all over the country next morning.

This publication has, by furnishing reliable reports as to temperature and rain-fall during the growing season, rendered ineffectual the attempts made by grain speculators to circulate false reports of crop conditions, designed to affect the market favorably to their interests.

WEATHER MAP.

A daily issue of the a. m. weather map has been made at thirty-nine stations during the year.

There being a constant and increasing demand for full and complete rain-fall reports from those using the morning maps and bulletins of this service, arrangements were made in December by which observers telegraph with their a. m. reports the precipitation measured during the past twenty-four hours, instead of since the preceding observation. This has given increased value to the information published and will be continued.

On July 1 a most liberal policy will go into effect in regard to the distribution of the weather reports of the Signal Service. The offices at Boston, New York City, Saint Louis, and Kansas City will issue two daily weather maps and will furnish copies of each to all post-offices that can be reached with the 8 a. m. issue by 4 p. m. of the same day, and with the 8 p. m. map by 9 a. m. of the following day; Boston and New York to all towns of 2,000 inhabitants or more; Saint Louis to towns of 1,500 and over, and Kansas City to towns of 1,000 or more.

The Cincinnati and Philadelphia offices will issue the a. m. map and will furnish postmasters of towns of 2,000 inhabitants or more. Later, steps will be taken to issue a p. m. map at these two offices, and also at Chicago after October 1, 1888.

Detroit, Cleveland, Buffalo, Sandusky, and Rochester will issue a. m. maps to a large number of post-offices that can be reached by rail before 4 p. m., and it is probable that in the near future these stations will also take up the p. m. map.

The postmasters to whom the maps are sent will be furnished with suitable frames for holding the maps, which will be displayed in some prominent place frequented by the general public. In addition to the two framed maps, each post-office will be furnished with a printed explanation in a smaller frame, so that the public can, by comparison or otherwise, get the utmost information from the maps, which ought to be of great practical value to all classes.

The above is only an outline of the plan about to be set in operation. Should it prove to be a popular one it will be indefinitely extended to meet the increased demands.

COTTON-REGION OBSERVATIONS.

After the close of the cotton-region observations in the fall, a close calculation developed the fact that the appropriation would be insufficient to resume the observations as usual in the spring at all stations, and after carefully canvassing the needs of the cotton-growing section, it was decided to close a number of stations that could be best spared rather than resume the observations at a later date than customary. This was in accordance with the expressed wish of all interests consulted.

SPECIAL RAIN-FALL OBSERVATIONS.

The system of special rain-fall stations went into operation on July 1, 1887, since which time 43 observers have made regular reports. These observers measure and record, at 2 p. m., each day, the amount of precipitation that has occurred during the preceding twenty-four hours. Weekly reports, on postal cards, are mailed to the observers at designated centers, ending with the record for Friday. Monthly reports are also forwarded to section centers, whence they are transmitted to the Chief Signal Officer.

When rain-fall equaling or exceeding 1 inch has fallen in the past twenty-four hours a full report of the observation is telegraphed to the center.

Rain-fall observations and reports are also made at stations other than second order on the United States Military Telegraph lines.

WARNINGS OF HEAVY SNOW-FALLS.

During the fall the Chief Signal Officer arranged with the officials of the various railroads to furnish them warnings of the approach of heavy snow-falls sufficiently in advance to enable them to prevent as far as possible impediments to travel and the movement of freight trains caused by snow blockades. These warnings were tele-

graphed to the Signal Service observers, with direction to communicate at once with the proper official. Whenever requested these warnings were telegraphed direct to the official designated by the railroad to receive them.

MISCELLANEOUS OBSERVATIONS.—INSTRUMENTAL CORRECTIONS DISCONTINUED.—OFFICES IN GOVERNMENT BUILDINGS.—DESTRUCTION OF OBSOLETE FORMS, ETC.—REVISION OF FORMS.—WEATHER CODE, ETC.

In December all the self-registers for anemometers and wind vanes were put in working order and shipped to points where a continuous record of the direction of the wind is considered of the most importance. A number of others will be ready for issue shortly.

The principal stations of the service have been furnished with the Ricard's barograph and the Ricard's thermograph and a continuous record of pressure and temperature will now be added to the other valuable data accumulated.

Observations of the Piché evaporimeter are now taken daily at twenty selected stations, and monthly reports are forwarded by the observers.

Hourly observations of the barometer were begun in Washington City in May, 1887, and have been continued throughout the year.

Observers have been directed to determine, as accurately as possible, the rate per hour at which excessive rain-fall occurs, in addition to the times of beginning and ending, and the amount that falls in inches and hundredths.

A record is now kept at all full observing stations of the daily change in temperature, so that the normal daily variation or daily variability of the climate at each place can be readily obtained. This information will be most valuable.

Hourly barometric observations during a number of months have been taken at a large majority of the stations of the second order, for use in computing the hourly oscillation at each.

On January 1 the systematic collection of simultaneous observations at sea was discontinued, and this work was transferred to the hydrographic office of the Navy Department.

Owing to the great labor imposed in reducing marine barometer observations to standard gravity, and the confusion and loss of time that have resulted in computing barometric data of previous years which were not reduced to standard gravity, this correction has not been applied to observations taken by this service since January 1.

On January 1 the practice of applying corrections to thermometer readings, except where they are $\pm$ 0.3 was discontinued, as instruments having corrections greater than $\pm$ 0.3 are called in for comparison. This, in fact, eliminates the corrections for thermometers, except in extraordinary cases, and thus removes a constant source of liability to error.

Systematic and continued efforts have been made to obtain rooms for the signal offices in public buildings which possess the necessary requirements for exposure of instruments, accessibility to the public, and of location in the business part of the city, etc. These efforts have resulted in securing desirable quarters in Government buildings at Toledo, Ohio, Shreveport, La., Pensacola, Fla., Sandusky, Ohio, and Bismarck, Dak. Arrangements have also been made with the Treasury Department to construct, when practicable, the tower or roof of the buildings now under contract, and also those contemplated, so as to make them suitable for the exposure of instruments. A list of Signal Service stations at which rent is paid was furnished the honorable the Secretary of the Treasury, with a request to assign two rooms, one for office and the other for store-room, in Government buildings, as soon as finished. This action has already resulted in the assignment of rooms on and after July 1, 1888, at Kansas City, Mo., Parkersburgh, W. Va., and Harrisburg, Pa., and on August 1, 1888, at Erie, Pa.

Steps have been taken to secure a list of all the obsolete forms, valueless books, papers, etc., which have accumulated at the stations during the eighteen years the service has been in existence. These have been disposed of to the best advantage, or destroyed if utterly worthless.

The blank meteorological reports used by observers have been thoroughly revised to meet the new requirements, and, in addition, printed blanks, abstracts of journal, and annual reports of the operation of station, have been printed and sent to observers for use during the year 1888.

On July 16 a new telegraphic cipher or "weather code," devised by the Chief Signal Officer, was put in operation at all stations and has met with unqualified success and has also resulted in a large saving in the expense for telegraphing reports.

As an absolute protection against loss through the telegraphing of unauthorized or unnecessary reports, observers have been instructed to report at once, by mail, whenever they receive, over circuit or otherwise, a greater number of cipher weather reports, or any reports that contain a greater number of words than are authorized.

In addition to the reports heretofore required, observers have been recently directed

to complete tables for each month since observations began, to show the dates on which the temperature fell 20 degrees or more; and was 40 degrees or less in the same twenty-four hours. These tables are found to be very valuable, and can be applied to a number of important purposes.

For some months past all regular reporting stations have prepared and charted the normal weather conditions of temperature, rain-fall, etc., for each day of the month, as compared with the current month. Several newspapers have kept displayed in their columns diagrams of these charts, and they have been an important factor in the instruction of the people in the climatology of the section in which they reside. For purposes of reference these charts will prove invaluable.

GENERAL INSTRUCTIONS TO OBSERVERS.

The compilation of the "General Instructions to Observers of the Signal Service" was completed early in the year. It was printed and copies furnished to all observers about December 1. This work was very carefully performed, and the "Instructions" contain all the information necessary to enable an observer to perform his duties accurately and intelligently.

By the plan of printing the special instructions for the preparation of meteorological forms on the blank forms themselves, it is believed that the new edition of "General Instructions" will last for many years without material revision.

INSTRUCTION OF ENLISTED MEN.

Arrangements have been made for the thorough instruction of all newly enlisted men under the personal supervision of the observers to whose stations they are assigned. As a rule, new men are not promoted to be first-class privates until they have completed the course and been reported as proficient in all the meteorological and station duties required of an assistant observer. Sixty-three enlisted men have been under instruction. Of this number 18 have been promoted and 2 discharged.

EXAMINATION OF BIDS.—PURCHASE OF FURNITURE AND INSTRUMENTS.

The bids for all supplies used at stations of the service are carefully scrutinized and great care exercised in recommending awards; 1,361 bids were examined and action recommended thereon during the year.

The schedule of proposals for all supplies and stationery purchased for issue to stations, recommendations for purchase after award is made, and table of fixed charges against appropriations, are prepared in the stations division. Recommendations in regard to all changes of instruments and instructions to stations covering the same are prepared and issued by this division.

All articles for transmission from this office to the stations are carefully inspected before the purchase is made.

By a judicious management of the limited appropriations under the control of the stations officer, it has been possible to purchase new furniture as enumerated below, and it has been sent to the various stations: 38 desks, 37 tables, 85 book-cases, 90 tip-back chairs, 140 office chairs, 40 water-coolers, 50 stands for coolers, 60 letter-copying presses, and 130 letter-press stands; besides covering the floors of 37 offices with linoleum.

The standard Maring anemometer support has replaced the old support at 37 stations during the year; total number now in use, 55. At other stations where the roof facilities would not admit of the erection of that support, 16 telescopic anemometer supports have been erected. The standard 6-foot wind vane with anti-friction rollers has replaced the old 12-foot vane at 51 stations.

The following stations have been supplied with caligraphs: New York, Boston, Chicago, Cincinnati, Detroit, Saint Louis, Philadelphia, Milwaukee, Wood's Holl, Prescott, San Antonio, Baltimore, Buffalo, Indianapolis, and San Francisco.

All stations on the sea and lake coasts have been supplied with the anemometer cross-arm attachment, in order that a comparison may be made every two months between the station and extra anemometers.

The standard thermometer shelter has been erected at 26 stations during the year, and is now in use at all second-order stations where a good roof or sod exposure could be obtained. A report was received from all stations as to the condition of the shelter and supports, and in each case the necessary repairs have been made and the shelters and supports repainted.

The rain-gauge adopted as the standard for the Signal Service (pattern of 1885) has been furnished to all stations except the special cotton-region stations, and gauges of all other patterns have been called in. This will insure accuracy in the measurements of precipitation not heretofore attained.

One hundred and thirty-four tripod supports for rain and snow gauges have been sent to the stations and are now in use. These supports have proved of great utility in making the exposure of the gauges, always keeping them in an upright position.

A detailed report has been made by each station as to the condition of the anemometer and wind vane supports, and wherever required the necessary repairs have been made and the supports repainted.

New river gauges have been erected at the following special river stations: Hinton, W. Va.; Gallipolis, Ohio; Circleville, Ohio; Madison, Ark.; Manhattan, Kans.; Falmouth, Ky.; Louisa, Ky; Catlettsburgh, Ky., and Portsmouth, Ohio.

NUMBER OF STATIONS IN OPERATION EACH YEAR SINCE 1870.—APPROPRIATIONS SINCE 1884.

In order to show the expansion of the service, year by year, I submit the following statement of the stations in operation each year since 1870:

Signal Service stations in operation during each year from 1870 *to* 1888, *both inclusive.*

Designation.	1870.	1871.	1872.	1873.	1874.	1875.	1876.	1877.	1878.
Stations of the first order	1	1	1	1	1	1	1	1	1
Stations of the second order	25	54	65	80	92	98	106	116	136
Stations of the third order	.....	.....	.....	.....	.....	.....	.....	29	36
Repair stations	.....	.....	.....	.....	.....	.....	38	10	12
Printing stations	.....	.....	.....	1	3	3	3	3	3
Display stations	.....	.....	.....	.....	.....	.....	.....	9	11
Special river stations	.....	.....	.....	19	20	20	23	23	23
Special cotton-region stations	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total	26	55	66	101	116	122	171	191	222

Designation.	1879.	1880.	1881.	1882.	1883.	1884.	1885.	1886.	1887.	1888.
Stations of the first order	1	1	1	1	1	1	1	1	1	1
Stations of the second order	158	173	171	169	143	133	152	146	145	149
Stations of the third order	30	39	47	45	42	68	58	33	31	30
Repair stations	17	49	44	3	27	7	8	11	13	24
Printing stations	3	3	3	3	3	3	3	1	.....	.....
Display stations	46	50	61	74	7	63	64	66	63	68
Special river stations	30	29	29	30	30	40	66	69	70	78
Special rain-fall stations	.....	.....	.....	.....	.....	.....	.....	.....	.....	43
Special cotton-region stations	.....	.....	87	127	124	138	137	135	133	116
Total	285	344	443	452	377	458	489	462	456	509

APPROPRIATIONS.

In this connection it will not be out of place to add the appropriations for each year since 1884 for the various branches under the control of the stations division. The table can not be carried farther than 1884, as prior to June 30 of that year the appropriations for the Signal Service were made in a lump sum.

Items.	For the year ending June 30—				
	1884.	1885.	1886.	1887.	1888.
Expenses, storm signals	$10,000	$10,000	$11,000	$10,000	$10,000
Instrument shelters	500	2,000	2,000	2,000	2,000
Rents, etc., offices	40,000	40,000	41,500	35,000	35,000
River and flood	5,000	10,000	10,000	9,000	9,000
Maps and bulletins	25,000	25,000	25,000	25,000	25,000
Cotton region	7,000	7,000	7,000	7,000	7,000

NEW SYSTEM OF METEOROLOGICAL OBSERVATIONS.

With the termination of the year which ends to-day, the system of tri-daily telegraphic observations will be discontinued, and observations made at 8 a. m. and 8 p.

m., 75th meridian time, will constitute the regular series. The 3 p. m. observation will be continued and recorded until January 1, 1889, but it will not be used in connection with the regular 8 o'clock series.

All arrangements have been made for effecting the change on July 1. The observers have been fully instructed and the necessary alterations in the meteorological forms have been indicated in official orders and letters.

Hereafter the river observations at all stations and in all river districts will be made at 8 a. m. seventy-fifth meridian time. Sunset observations will no longer be made, but in lieu thereof observers will make a local prediction at 8 p. m. as to whether rain will or will not fall during the succeeding twenty-four hours. This local prediction will be based upon the atmospheric conditions existing at the time. It will be included in the 8 p. m. telegraphic report to the Chief Signal Officer.

WORK PERFORMED.

The clerks employed in this division have worked faithfully, intelligently, and well, and the efficiency of the service has been greatly promoted by the zeal and application with which they have performed the many duties which naturally belong to a division having under its direct control the several systems of stations and substations, together with the force employed thereat.

In this division, which includes the Washington City meteorological station, there is no cessation of work; the day force being relieved at 4 p. m. by the second relief, which is, in turn, relieved at 11 p. m. by a force that remains during the night and does not go off duty until 8 a. m. the following day.

In the subdivision which scrutinizes the work of observers, verifies the accuracy of their observations, and recomputes their reports, the following records have been examined:

Monthly original records	1,802
Monthly meteorological reports	1,802
Monthly records of wind signals	1,380
Anemometer and anemoscope record sheets	77,118
Annual meteorological summaries	462
Monthly reports of hourly wind movement	82
Telegraphic cipher reports	27,450
Observer's telegraphic-error letters	875
Translator's cipher-error sheets examined and acted upon	1,098

A large amount of miscellaneous work has also been performed in this subdivision, such as the copying of tri-daily bulletins, copying special tables used at stations for the reduction of barometer readings to sea-level, tabulating the hourly wind direction and velocity at Washington for sixty-six months, etc.

The work has been kept up from day to day, and no delay has occurred at any time.

As an indication of the business transacted, I would state that during the year over 30,500 communications were sent from this division to observers and others, in connection with the routine work of the service.

In order to simplify matters of detail and expedite the routine work, the telegraph division was merged in the stations division on July 14.

Owing to the fact that on July 1 I am to be relieved from this division, I have not included in the foregoing any statement of the work proposed for the coming year, except such as has been already provided for.

Respectfully submitted.

F. R. DAY,
Second Lieutenant, Signal Corps, Assistant and Stations Officer.

The CHIEF SIGNAL OFFICER.

APPENDIX No. II.

SIGNAL-SERVICE STATIONS.—LATITUDE, LONGITUDE, ELEVATION OF BAROMETERS, AND CHANGES.

Station.	Latitude.	Longitude.	Height, Jan. 1, 1886.	Changes since January 1, 1886.
	° ′	° ′	*Feet.*	
Abilene, Tex	32 14	99 45	1,744	Moved Aug. 1, '86; H. 1,748 feet.
Albany, N. Y	42 39	73 45	83	Moved Oct. 26, '86; H. 85 feet.
Alpena, Mich	45 5	83 30	609	
Apache, Aris	33 48	109 57	5,050	Closed Mar. 31, '88.
Assinaboine, Mont	48 32	109 42	2,720	
Astoria, Oregon	46 11	123 48	.....	Opened Feb. 15, '87; H. 20 feet.
Atlanta, Ga	33 45	84 23	1,129	
Atlantic City, N. J	39 22	74 25	13	Moved Dec. 1, '87; H. 34 feet.
Augusta, Ga	33 28	81 54	183	
Baltimore, Md	39 18	76 37	45	
Bennett, Dak	44 43	100 39	1,510	
Benton, Mont	47 50	110 40	2,681	Closed Oct. '86.
Bidwell, Cal	41 53	120 11	4,640	
Bismarck, Dak	46 47	100 38	1,694	Moved Oct. 1, '87; H. 1,681 feet.
Block Island, R. I	41 10	71 36	27	Moved Nov. 1, '87; H. 26 feet.
Boisé City, Idaho	43 37	116 8	2,750	
Boston, Mass	42 21	71 4	125	
Bridger, Wyo	41 28	110 30	6,643	
Brownsville, Tex	25 53	97 26	57	
Buffalo, N. Y	42 53	78 53	690	
Buford, Dak	48 0	103 56	1,900	
Cairo, Ill	37 0	89 10	344	
Canby, Wash	46 16	124 4	179	
Cape Henry, Va	36 56	76 0	16	Closed Dec. 31, '87.
Cape May, N. J	38 56	74 58	.....	Closed Oct. 31, '85.
Cape Mendocino, Cal	40 26	124 24	637	Moved to Eureka Dec. 31, '86.
Cedar Keys, Fla	29 8	83 2	22	
Charleston, S. C	32 47	79 56	52	
Charlotte, N. C	35 13	80 51	808	
Chattanooga, Tenn	35 4	85 15	772	
Cheyenne, Wyo	41 8	104 48	6,105	
Chicago, Ill	41 52	87 38	661	Moved Jan. 1, '87; H. 715 feet.
Chincoteague, Va	37 55	75 23	8	Closed June 16, '87.
Cincinnati, Ohio	39 6	84 30	628	
Cleveland Ohio	41 30	81 42	690	
Columbus, Ohio	39 58	83 0	812	
Concho, Tex	31 25	100 24	.....	Moved to Abilene; closed Sept. 15, '85.
Concordia, Kans	39 35	97 41	1,384	
Corpus Christi, Tex	27 49	97 25	.....	Opened Feb'y 1, '87; H. 20 feet.
Custer, Mont	45 42	107 34	3,040	
Davenport, Iowa	41 30	90 38	615	
Davis, Tex	30 38	103 56	4,928	
Dayton, Wash	46 19	117 56	.....	Closed Nov. 30, '85.
Deadwood, Dak	44 23	103 43	4,600	Closed Dec. 31, '87; moved to Rapid City.
Denver, Colo	39 45	105 0	5,294	Moved Dec. 1, '87; H. 5,281 feet.
Des Moines, Iowa	41 35	93 37	849	Moved Jan. 1, '87; H. 866 feet.
Detroit, Mich	42 20	83 3	662	
Dodge City, Kans	37 45	100 0	2,517	Moved Sept. 1, '86; H. 2,524 feet.
Dubuque, Iowa	42 30	90 44	665	
Du Chesne, Utah	40 35	109 50	.....	Opened Dec. 1, '87; H. 5,500 feet.
Duluth, Minn	46 48	92 6	672	
Eastport, Me	44 54	66 59	61	Moved Feb., '87; H. 53 feet.
Elliot, Tex	35 30	100 21	2,650	
El Paso, Tex	31 47	106 30	3,764	Moved Apr. 1, '88; H. 3,796 feet.
Erie, Pa	42 7	80 5	681	
Escanaba, Mich	45 48	87 5	606	
Eureka, Cal	40 48	124 11	.....	Opened Jan. 1, '87; H. 64 feet.
Fort Smith, Ark	35 22	94 24	470	
Fresno, Cal	36 43	119 49	.....	Opened Aug. 16, '87; H. 313 feet.
Frisco, Utah	38 25	113 16	6,400	Closed Dec. 31, '87.
Galveston, Tex	29 18	94 47	40	Moved Apr. 1, '88; H. 44 feet.
Grand Haven, Mich	43 5	86 18	620	

Signal-Service stations.—Latitude, longitude, elevation of barometers, etc.—Continued.

Station.	Latitude.	Longitude.	Height, Jan. 1, 1886.	Changes since January 1, 1886.
	° ′	° ′	Feet.	
Grant, Ariz	32 39	109 57	4,856	Moved July 16, '87; H. 4,860 feet.
Green Bay, Wis	44 31	88 0	.....	Opened Sept. 1, '86; H. 616 feet.
Greencastle, Ind	39 39	86 51	897	Closed Nov. 10, '86.
Hatteras, N. C	35 15	75 40	12	Moved Apr. 1, '87; H. 11 feet.
Helena, Mont	46 34	112 4	4,069	
Huron, Dak	44 21	98 9	1,307	
Indianapolis, Ind	39 46	86 10	766	
Indianola, Tex	28 32	96 31	26	Closed Aug. '86; moved to Corpus Christi.
Jacksonville, Fla	30 20	81 39	43	
Jupiter, Fla	26 57	80 7	.....	Opened Jan. 1, '88; H. 28 feet.
Keeler, Cal	36 35	117 50	3,620	
Keokuk, Iowa	40 22	91 26	618	
Key West, Fla	24 34	81 49	20	Moved Jan. 1, '87; H. 22 feet.
Kitty Hawk, N. C	36 0	75 42	9	Closed Dec. 31, '87.
Knoxville, Tenn	35 56	83 58	970	
La Crosse, Wis	43 49	91 15	725	Moved Feb. 1, '87; H. 744 feet.
Lamar, Mo	37 32	94 15	1,028	
Lansing, Mich	42 44	84 32	.....	Opened Jan. 1, '87; H. 870; moved Feb'y 1, '88; H. 883.
Leavenworth, Kans	39 19	94 57	842	
Lewiston, Idaho	46 8	117 5	.....	Closed Dec. 31, '85.
Little Rock, Ark	34 45	92 6	311	Moved Mar. 1, '87; H. 309 feet.
Los Angeles, Cal	34 3	118 15	339	
Louisville, Ky	28 15	85 45	551	
Lynchburg, Va	37 25	79 9	652	Moved May 1, '88; H. 658 feet,
Mackinaw City, Mich	45 47	84 39	605	Closed Mar. 31, '88; moved to Sault Ste. Marie.
Macon, N. C	34 42	76 40	11	Closed Dec. 31, '87.
Maginnis, Mont	47 12	109 10	4,370	
Manchester, N. H	42 58	71 28	.....	Opened Mar. 1, '87; H. 246 feet.
Marquette, Mich	46 34	87 24	672	
Memphis, Tenn	35 9	90 3	320	
Milwaukee, Wis	43 2	87 54	697	
Mobile, Ala	30 41	88 2	35	
Montgomery, Ala	32 23	86 18	219	Moved July 1, '87; H. 217 feet.
Montrose, Colo	38 30	107 56	5,780	
Moorhead, Minn	46 52	96 44	926	
Mt. Washington, N. H	44 16	71 18	6,279	
Nantucket, Mass	41 7	70 6	.....	Opened Oct. 18, 86; H. 14 feet.
Nashville, Tenn	36 10	86 47	549	
New Haven, Conn	41 18	72 56	107	
New London, Conn	41 21	72 5	47	
New Orleans, La	29 58	90 4	52	
New York, N. Y	40 43	74 0	164	Moved Apr. 1, '86; H. 168 feet. Mar. 17, '87; H. 158 feet. June 8, '87; H. 185 feet.
Norfolk, Va	36 51	76 17	30	Moved Feb. 1, '88; H. 69 feet.
Northfield, Vt	44 10	72 41	.....	Opened Mar. 1, '87; H. 871 feet.
North Platte, Nebr	41 8	100 45	2,841	
Olympia, Wash	47 3	122 53	36	
Omaha, Nebr	41 16	95 56	1,113	
Oswego, N. Y	43 29	76 35	335	
Palestine, Tex	31 45	95 40	533	
Pensacola, Fla	30 25	87 13	30	Moved Apr. 1, '88; H. 56 feet.
Philadelphia, Pa	39 57	75 9	117	
Pike's Peak, Colo	38 50	105 2	14,134	
Pittsburgh, Pa	40 32	80 2	771	Moved Oct. 1, '86; H. 847 feet.
Poplar River, Mont	48 8	105 10	2,000	
Port Angeles, Wash	48 7	123 6	14	
Port Huron, Mich	43 0	82 26	633	Moved Nov. 1, '86; H. 639 feet.
Portland, Me	43 39	70 15	99	
Portland, Oreg	45 32	122 43	80	
Prescott, Ariz	34 33	112 28	5,389	
Pueblo, Colo	38 18	104 36	.....	Opened June 27, 88; H. 4,724 feet. Moved from Las Animas.
Raleigh, N. C	35 45	78 37	.....	Opened Jan. 1, '81; H. 375 feet.
Rapid City, Dak	44 4	103 12	.....	Opened Jan. 1, '88; H. 3,230 feet.
Red Bluff, Cal	40 10	122 15	337	Moved June 15, '86; H. 342 feet.
Rio Grande City, Tex	26 23	98 48	230	
Rochester, N. Y	43 8	77 42	621	
Roseburgh, Oregon	43 13	123 20	523	
Sacramento, Cal	38 35	121 30	64	
Saint Louis, Mo	38 38	90 12	571	
Saint Michaels, Alaska	63 28	161 48	30	Closed June 30, '86.
Saint Paul, Minn	44 58	93 3	831	
Saint Vincent, Minn	48 56	97 14	804	
Salt Lake City, Utah	40 46	111 54	4,348	
San Antonio, Tex	29 27	98 28	781	

Signal-Service stations.—Latitude, longitude, elevation of barometers, etc.—Continued.

Station.	Latitude.	Longitude.	Height, Jan. 1, 1888.	Changes since January 1, 1888.
	° ′	° ′	*Feet.*	
San Diego, Cal	32 43	117 10	67	
Sandusky, Ohio	41 25	82 40	633	Moved Apr. 1, '88; H. 629 feet.
Sandy Hook, N. J	40 28	74 0	28	Closed Nov. 12, '86.
Sanford, Fla	28 48	81 23	25	Closed June 30, '87.
San Francisco, Cal	37 48	122 26	69	
San Luis Obispo, Cal	35 18	120 39	270	Closed Apr. 18, '86. (Burned out.)
Santa Fé, N. Mex	35 41	105 57	7,026	
Savannah, Ga	32 5	81 5	87	
Shaw, Mont	47 31	111 48	3,550	Closed Oct. 31, '86.
Shreveport, La	32 30	93 40	227	Moved Feb. 1, '88; H. 249 feet.
Sill, Ind. T	34 40	98 23	1,260	
Sitka, Alaska	57 3	135 19	63	Closed Sept. 30, '87.
Smithville, N. C	33 55	78 1	34	Closed Oct. 31, '86.
Spokane Falls, Wash	47 40	117 25	1,909	
Springfield, Ill	39 48	89 39	644	
Springfield, Mo	37 12	93 18	.....	Opened Sept. 20, '87; H. 1,356 feet.
Stanton, N. Mex	33 30	105 26	6,150	Moved Jan. 26, '88; H. 6,154 feet.
Stockton, Tex	30 53	102 53	2,004	Closed June 20, '86
Sully, Dak	44 39	100 39	1,600	
Tatoosh, Wash	48 23	124 44	86	
Thomas, Ariz	33 4	110 2	2,710	Closed Apr. 1, 87.
Titusville, Fla	28 34	80 51	.....	Opened June 10, '87.
Toledo, Ohio	41 40	83 34	651	Moved Feb. 1, '88; H. 673 feet.
Totten, Dak	47 57	98 57	1,490	Moved May 1, '86; H. 1,487 feet.
Unalaska, Alaska	53 53	166 32	13	Closed May 23, '86.
Valentine, Nebr	42 50	100 32	2,603	Moved Oct. 1, '86; H. 2,604 feet; Apr. 1, '87; H. 2,614 feet.
Vicksburg, Miss	32 22	90 53	209	Moved May 11, '86; H. 222 feet.
Walla Walla, Wash	46 2	118 20	1,018	
Washington, D. C	38 54	77 3	106	
West Las Animas, Colo	38 4	103 12	3,899	
Wilmington, N. C	34 14	77 57	52	
Winnemucca, Nev	40 56	117 43	4,358	Moved Mar. 1, '88; H. 4,344 feet.
Wood's Holl, Mass	41 33	70 40	.....	Opened May 1, '87; H. 22 feet.
Yankton, Dak	42 54	97 23	1,228	Moved May 1, '86; H. 1,234 feet.
Yuma, Ariz	32 45	114 36	141	

APPENDIX No. 12.

REPORT OF THE ASSISTANT PROFESSOR IN CHARGE OF THE INSTRUMENT DIVISION.

SIGNAL OFFICE, INSTRUMENT DIVISION,
Washington City, July 3, 1888.

SIR: I have the honor to make the following report on the work of the instrument division for the fiscal year July, 1887, to July, 1888.

The principal duties of this division are—the carrying on of experimental work relating to instruments; the comparison of thermometers with standards; the adjustment of barometer scales and determination of their corrections; the testing of rain-gauges; the supervision of all relating to exposure of instruments at stations; the preparation of specifications for instruments; the devising and testing of new forms of apparatus; the standardizing of anemometers; the custody of all the meteorological instruments, their packing for transportation to stations, and the keeping of a book account of their issue and return; the care of self-registering instruments in operation at this station—3 barographs, 2 rain-gauges, 1 anemometer, and 1 anemograph; the explanation of instruments on exhibition in instrument-room to visitors; the suggestion of replies to letters about instruments, barometric pressure, temperature, humidity, and evaporation.

Two thousand one hundred and eighty Signal Service thermometers and twenty belonging to private parties were compared with standards. The maximums were compared every 10° from 32° to 102,° and about twenty-five of the number intended for cold stations in the Northwest were calibrated down to —28°. The other mercurial and minimum alcohol thermometers were compared every 20° apart from —28° to 32°, and every 10° apart from 32° to 102°; the minimums only to 92°.

About 40 minimums for places in the Northwest were compared in alcohol cooled down to —60° by means of liquefied nitrous oxide.

An improvement to the thermometers has been adopted, consisting of an enamel strip on the brass back on which the numbering of the degrees is etched. This renders the instrument more easily read and the figures will not become indistinct by corrosion, as was the case when on the brass. The thermometers purchased of H. J. Green during the year, seven hundred and thirty-five in number, were all of this kind. Six hundred and fifty-three old thermometers were rescaled with enamel and the graduations etched on tube. The mercurials have no corrections as great as 0.3°, and the minimums none greater than 0.5°. About eighty stations were supplied with complete or partial sets of these rescaled instruments, so as to give all important places at least one working set of thermometers with corrections less than 0.3° and dispense with the application of corrections to the thermometer readings. Since January 1 no corrections have been applied.

A Richard thermograph and a Draper were tested. Thirty seven Richard thermographs and five Richard barographs were issued to stations.

To ascertain the amount of evaporation throughout the United States, twenty Piche evaporometers were issued to various stations. They are mounted in the same shelter with the thermometers. From a daily reading during the months of June, July, August, and September, and the mean temperature and dew-point as shown by the tri-daily observations of the wet and dry thermometers, the relation between the amount of evaporation and the humidity of the air will be determined.

Experiments have been made in the office to ascertain the relation between the evaporation shown by the Piche instrument and that from a surface of water in a shallow tin dish containing 40 cubic centimeters of water, exposed in the open air under shelter and also in a closed room.

Experiments were made to ascertain the effect of wind on evaporation. The evaporation from a Piche instrument in calm air was compared with that from one whirled for an hour at various velocities. For this purpose the whirling arm, 28 feet long, used in standardizing anemometers mounted in the Pension Office inclosure, was used. The loss of weight by evaporation was measured with a balance. The results of these experiments were, that with the temperature of the air 84° and the relative humidity 50 per cent., the evaporation at 5 miles an hour was 2.2 times that in a calm; at 10 miles, 3.8; at 15 miles, 4.9; at 20 miles, 5.7; at 25 miles, 6.1, and at 30 miles, 6.3,

For standardizing anemometers a whirling apparatus was designed. A special form of Robinson anemometer, with three friction rollers for bearing of spindle and new dial device for counting the revolutions, was designed. Nine sets of cups and cross-arms were procured, cups 4, 5, and 6 inches in diameter, on arms 5, 6, and 7 inches long. Experiments will be made to ascertain what sized cup and what length of arm will give a coefficient most nearly constant for different velocities.

The experimental work so far done by Professors Hazen and Marvin shows that the coefficient of 3, that is, the relation between wind velocity and travel of center of cup, for the Signal Service pattern of instrument, a 4-inch cup on a 6-inch arm, is about right for a velocity of 20 miles. For 5 miles it gives results for velocity 15 per cent. too small, and for 10 miles 8 per cent. too small.

Professor Marvin, who is on duty in this division, has had duty in connection with the board on promotions in the War Department, the preparation of examination questions, the marking of papers, etc. His duties also comprised the verification of the official weather indications; the designing of a new form of double self-register for wind direction and velocity; the designing of a self-registering rain-gauge, which records electrically every tenth of an inch of rain-fall by a mark on the same sheet as the register of wind velocity and direction; the designing of a sunshine recorder, giving a month's record on a single sheet photographically. He has also tested the tele-thermometer system of the Bureau of Engraving and Printing, a sunshine recorder for Harvard College Observatory, samples of telegraphic wire, and the insulation of cables.

Tests of the conductivity and insulation of two cables were made on the steam-ship pier at New York. One of these cables was for the Jupiter Inlet line; the other belonged to the Fish Commission, and was to be laid at Havre de Grace. Time was spent by myself in preparation for indication-work. For three months the morning map of isobars and isotherms was drawn. Indications for the month of February were made, and Lieutenant Thompson's practice indications for the same month were verified.

The differences of barometers at stations, shown by comparative readings made on last day of each month, were tabulated. Actions were taken relating to changes in their corrections, the corrections of the back records where necessary, the calling in of instruments, the issue of new ones, etc. The results of all comparative barometer readings made by inspectors at stations were also tabulated.

Papers relating to issue of instruments to voluntary observers brought before loan board were examined.

Morning weather-maps for 78 days were examined on which rain or snow from a cloudless sky was observed. This was reported upon.

The records of the lowest minimum temperature observed at Signal Service stations, from the opening of the stations, were corrected for the error of the instrument where the instrument in use was known and its correction had been found by comparison with standard. The result of this has been to make temperatures of —30° on the average —27°. The correction has been proportionately less between —30° and 0°. Above 0° the corrections have been mostly insignificant.

The same work was begun for the back records of maximum temperatures.

A rough chart was prepared showing probable evaporation in arid region of New Mexico, Arizona, and California, based on readings of wet and dry thermometers.

A glass cylinder was cut and ground for cistern of mercurial gauge belonging to aneroid barometer comparator.

Oils, acids, alcohol, and ammonia purchased for office use were tested.

The new bronze meter and yard bar by Rogers was tested.

The following were the number and kinds of instruments received during the year and issued to stations:

Description.	Received.	Issued.	Description.	Received.	Issued.
Barometers	120	115	Rain-gauges	37	47
Barographs	5	5	Snow-gauges	1	44
Thermometers	1,763	1,252	Wind-vanes	.....	52
Thermographs	40	37	Clocks	95	42
Anemometers	93	97	Thermometer whirlers	15	55
Anemometer self-registers	38	32	Evaporometers	25	20

In addition there were issued to voluntary observers the following:

Description.	Issued.	Description.	Issued.
Barometers	6	Rain-gauges	124
Thermometers	334	Wind-vanes	4

Recently the issue of rain-gauges has been put in charge of the property division, so that the above figures do not represent all the rain-gauges issued from this office during the year.

Very respectfully,

T. RUSSELL, Jr.,
Assistant Professor in Charge Instrument Division.

General A. W. GREELY,
Chief Signal Officer, U. S. Army.

APPENDIX No. 13.

REPORT OF THE EXAMINER'S DIVISION.

SIGNAL OFFICE,
Washington City, July 27, 1888.

SIR: In compliance with instructions contained in memorandum No. 81, dated Signal Office, June 26, 1888, I have the honor to submit the following report of the operations of the examiner's division for the fiscal year ended June 30, 1888.

At the close of the last fiscal year Second Lieut. John C. Walshe, Signal Corps, was temporarily in charge. Lieutenant Woodruff resumed charge of the division July 7, 1887, and so continued until July 15, 1887, when he was relieved by First Lieut. R. E. Thompson, Sixth Infantry, Acting Signal Officer, in accordance with instructions No. 46, series of 1887. Second Lieut. R. B. Watkins, Signal Corps, was in charge from September 1 to October 1, 1887, during the absence of Lieutenant Thompson on leave. On January 1, 1888, Lieutenant Thompson was relieved by myself, by virtue of instructions No. 94, dated December 27, 1887.

The only change in the working force has been the relief of the messenger, Private J. W. Rennie, Signal Corps, who had performed the duties of a clerk when not on messenger duty. His relief has been very materially felt, as his loss has been equivalent to the reduction of the force by one clerk. With this exception the force remains as at the close of the last year, viz, Sergt. James B. Newlin, Signal Corps, chief clerk, Mr. Zeph. Fenno, clerk, and Private C. P. Cronk, Signal Corps, clerk.

Commencing with July 1, 1887, the examining and recording of the vouchers of the property and disbursing officer, previous to payment, was discontinued. It was thought that this change would effect a large saving of work, but the addition of the vouchers for transportation, for commutations, and for medical attendance more than counterbalanced the saving contemplated, this work being increased instead of diminished.

Letters of authority for purchases and expenditures were issued by this division until January 11, 1888, when they were discontinued, and the system of covering all regular expenses and others that could be foreseen by special orders, and of those which could not be provided for in advance, by the autograph approval of the Chief Signal Officer, was adopted.

In the examination of the accounts current of the property and disbursing officer, for appropriations for the Signal Service, the only material errors found have been the occasional payment of a voucher out of the wrong appropriation, or the absence of some evidence necessary to complete the vouchers. The latter has in all cases been supplied, while in the former requests have been made to the Third Auditor of the Treasury for rectification by means of transfer settlements.

Considerable difficulty has been experienced in the adjustment of the accounts current of some of the officers in charge of United States military telegraph lines owing to the change in the method of accounting for the moneys received on the lines, promulgated in circular letter from this office of March 25, 1886, General Orders No. 58, Signal Office, December 21, 1886, and General Orders No. 28, Signal Office, May 18, 1887. The instructions contained in those orders not having been interpreted in the same way by all of the officers has led to some confusion, and caused much additional correspondence in rectifying the irregularities. This, however, has been accomplished and the new method is now understood, and the accounts current are at present being rendered with satisfactory accuracy; hence it is not apprehended that there will be any difficulty with them in the future. The accounts current of Lieut. R. B. Watkins, Signal Corps, which had been suspended for these causes, have been adjusted and disposed of except those for October, 1886, which are still held until that officer furnishes certain data necessary to their completion. The matter is in correspondence and it is expected that the accounts will soon be completed and disposed of. The accounts current of Lieut. W. D. Wright, Signal Corps, from August, 1887, to May, 1888, inclusive, and those of Lieut. James A. Swift, Signal Corps, from January, 1888, to April, 1888, are, for similar causes, held in suspension, but it is believed that they will soon be adjusted.

The current work has been kept well in hand, and much of that which had ac-

cumulated has been examined and disposed of; and, should nothing unforeseen occur to prevent, there is now a fair prospect of having the work brought up to date within a reasonable time.

The number of papers of all kinds received, including letters, property returns, accounts current, vouchers to property returns and accounts current, and other papers pertaining to them is 30,167. When it is considered that all of these have to be carefully examined and acted upon it will be seen that the work of the division is heavy, and that the energies of the small force of clerks are severely taxed in its accomplishment.

Returns of signal equipments and stores, with vouchers to the same, examined and forwarded to the Third Auditor of the Treasury	706
Accounts current of the property and disbursing officer, for appropriations, examined and forwarded to Third Auditor of the Treasury	11
Accounts current for line receipts United States military telegraph lines examined and disposed of	145
Vouchers and subvouchers to accounts current examined	15,616
Letters of authority for purchases and expenditures (including cancellations and amendments of the same) received, examined, recorded, and returned to the property and disbursing officer, up to and including January 11, 1888	2,825
Letters received and recorded	2,363
Letters and indorsements sent in connection with the examination of money accounts and property returns	2,658
Weekly, semi-monthly, and monthly statements of public funds (including semi-monthly statements of other line funds) recorded and verified	403
Certificates of deposit indorsed with proper appropriation recorded and returned to source from whence they came	227
Miscellaneous office memoranda written in regard to the work of the division	605
Miscellaneous papers prepared or examined	598
Errors, irregularities, and differences discovered	1,609
Papers of all kinds filed, including letters, accounts current, and vouchers to same, and other papers	8,903

Very respectfully, your obedient servant,

ROBT. CRAIG,
First Lieutenant, Fourth Artillery, A. S. O., Assistant and Examiner.

The CHIEF SIGNAL OFFICER.

Summary of work performed in examiner's division, office of the Chief Signal Officer, during the fiscal year ended June 30, 1888.

Items.	1887.						1888.						Total.
	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	
Returns of signal equipments and stores examined and forwarded to U.S. Treasury	77	82	134	6	4	163	148	32	16	.....	42	2	706
Letters sent in connection with the examination of money accounts and property returns	235	288	345	89	89	491	393	192	125	96	194	111	2,658
Letters received and recorded	282	176	138	253	154	179	289	157	157	294	166	142	2,363
Letters of authority for purchases and expenditures received, examined, and recorded	759	342	451	334	410	330	*149	.....	.....	.....	.....	.....	†2,825
Accounts current, United States military telegraph lines, examined and disposed of	15	9	13	10	8	14	3	16	5	9	23	20	145

* The issue of letters of authority was discontinued by order of the Chief Signal Officer January 11, 1888.

† *This* amount includes cancellations and amendments of letters of authority.

Summary of work performed in examiner's division, etc.—Continued.

Items.	1887.						1888.						Total.
	July.	Aug.	Sept.	Oct.	Nov.	Dec.	*Jan.	Feb.	Mar.	Apr.	May.	June.	
Accounts current of property and disbursing officer for appropriations, examined and sent to Treasury	.....	4	.....	1	2	.....	.....	.....	1	.....	1	2	11
Weekly, semi-monthly, and monthly statements of public funds recorded and verified	19	18	21	22	31	50	31	47	41	37	41	45	403
Errors, irregularities, and differences discovered	141	114	228	77	120	87	152	126	276	60	74	84	1,609
Office memoranda written in regard to the work of the division	59	89	69	74	57	59	43	38	45	24	26	31	605
Vouchers and sub-vouchers to accounts current examined	247	2,911	378	1,636	1,635	289	178	638	1,117	753	3,188	3,246	15,616
Papers of all kinds received, including letters, property returns, accounts current, vouchers, etc.	2,534	3,278	1,997	2,833	4,304	3,954	2,552	1,444	1,951	1,864	2,175	1,281	30,167
Miscellaneous papers prepared or examined	78	199	40	38	110	14	28	24	8	12	27	20	598
Papers of all kinds filed, including letters, accounts current, vouchers, and other papers	482	634	494	841	336	591	394	751	614	731	1,743	1,292	8,903
Certificates of deposit, indorsed with proper appropriation, recorded and returned	25	15	20	.....	10	35	14	.....	16	43	30	19	227

* The issue of letters of authority was discontinued by order of the Chief Signal Officer January 11, 1888.

ROBT. CRAIG,
First Lieutenant, Fourth Artillery, Acting Signal Officer and Assistant.

APPENDIX No. 14.

REPORT OF THE OFFICER IN CHARGE OF RECORDS DIVISION.

In compliance with existing instructions I have the honor to submit the following report of the work of the records division for the fiscal year ending June 30, 1888.

This division was established March 1, 1887, and has for its purpose the filing, classifying, and indexing of the meteorological records of the Signal Service; the control of the distribution of such records for use in the several divisions of this office; the furnishing of general information and statistics to the public; the preparation of correspondence relating to all classes of voluntary meteorological observers; the preparation of charts and statistical matter on special subjects; supervision of the elevations and exposure of instruments at all meteorological stations; the preparation of pressure, temperature, and precipitation normals; supervision of tornado work; preparation of marine data for daily cablegrams to the French Meteorological Office, and all correspondence relating thereto; the preparation of reduction tables; correspondence with public institutions and individuals, in search of meteorological and climatological information.

A general classification of the work in the records division will embrace three sub-divisions, viz: (1) Arrangement of facts and preparation of statistics; (2) furnishing information to the public; (3) filing, indexing, and distribution of records.

The Signal Office now collects yearly an average of nearly 190,000 forms, containing every variety of meteorological data. A vast aggregation of information has been gathering since November 1, 1870, when the regular official work of the Weather Bureau began, and its value to the public largely depends upon the readiness with which it can be examined and assimilated for any purpose.

A great collection of records, no matter how intrinsically valuable, becomes a heap of rubbish unless arranged and indexed relative to the uses for which such records are intended.

It is within the scope and one of the principal objects of the records division, to place the invaluable meterological collections of the Signal Office in such form as to facilitate, in every way, their examination and employment for the benefit of the public, with the least possible expenditure of time and labor.

By this means their value will be enhanced, more useful work accomplished, and the necessary clerical force reduced.

PERSONNEL.

At present the working force consists of one assistant professor, nine clerks, six copyists, and two messengers.

This number has varied during the year from a maximum of 30 to a minimum of 15.

REGULAR WORK.

The following tables published in the Weather Review have been prepared and furnished monthly to the review division:

No. 1.—Miscellaneous data from Signal-Service stations (in duplicate).

No. 2.—Comparative maximum and minimum temperatures at selected Signal Service stations, arranged by States.

No. 3.—Excessive and greatest monthly precipitation compiled from all available data.

No. 4.—Temperature of water in certain harbors of the United States.

No. 5.—Heights of rivers above low-water mark.

No. 6.—Winds exceeding 50 miles per hour, other than maximum velocities.

No. 7.—Monthly snow-fall, when any reported.

No. 8.—Depth of snow at end of month, when any reported.

The following additional tables, Nos. 9, 10, and 11, were furnished from December, 1887, to June 30, 1888, and No. 12 from April to June, 1888:

No. 9.—Miscellaneous data compiled from reports of voluntary observers.

No. 10.—Deviations from normal precipitation at selected voluntary stations.
No. 11.—Deviations from normal temperatures at selected voluntary stations.
No. 12.—Precipitation and temperatures in cotton-region stations.

A table of wind normals for the months of February, March, June, August, September, at 164 stations, was also prepared for the review division.

Monthly mean and normal temperatures, and monthly and normal precipitation, covering the entire period of observations at all stations of the Signal Service were furnished the stations division to be distributed to observers for use in preparing Form No. 178.

Prof. Charles Carpmael, director of the meteorological service of the Dominion of Canada, Toronto, Canada, has been furnished with tables of mean a. m., p. m., and midnight pressure and temperature for all Signal Service stations.

Mr. F. Wyneken, publisher of Atlantic Ice Reports, New York City, has been furnished semi-weekly with extracts from all reports received at this office of the occurrence of icebergs, field ice, derelicts, wrecks, and other floating obstructions to navigation in the North Atlantic.

The Engineering News, of New York City, has been furnished monthly with a table containing monthly values of temperature, wind, and precipitation from twenty-six selected stations.

River reports, showing stages of water in certain selected rivers, have been sent to the following persons monthly throughout the year, viz: Lieut. Col. C. B. Comstock, Corps of Engineers, New York City; Maj. A. McKenzie, Corps of Engineers, Rock Island, Ill.; engineer in charge Port Eads, La.; Lieut. G. A. Bingham, Corps of Engineers, secretary Missouri River Commission, Saint Louis, Mo.

WORK ON PERMANENT RECORDS.

The following work has been done on records for file:

Missing data entered on 3 a. m. and 10 p. m. charts, and charts completed from April 11, 1887, to March 20, 1888.

The following data for 1887 has been computed, verified, and tabulated:

(1) Monthly and annual precipitation for all stations of the Signal Service.
(2) Total monthly wind movement for all stations of the Signal Service.
(3) Monthly mean dew-point.
(4) Means of 7 a. m., 3 p. m., and 10 p. m. temperatures for all stations.
(5) Maximum velocities of wind at all stations of the Signal Service.
(6) Number of times wind was observed blowing from the eight principal points of the compass for all Signal Service stations.
(7) Maximum and minimum temperatures and precipitation at third-order stations.
(8) Number of clear, fair, cloudy, and rainy days at all Signal Service stations.
(9) Maximum pressure at all Signal Service stations.
(10) Minimum pressure at all Signal Service stations.
(11) Average cloudiness at all Signal Service stations.
(12) Mean maximum and minimum temperatures at all Signal Service stations.
(13) Means book from May, 1887, to May, 1888.

Eleven thousand and ninety-seven corrections have been made on the various forms from Signal Service stations.

FILING AND BINDING RECORDS.

All of the various meteorological forms received from observers reporting to this office (aggregating about 190,000 for the year) have been filed and classified. Considerable time has also been devoted to the re-arrangement and classification of records from abandoned stations, so far as could be done to advantage, with the storage room at present available. There are yet, however, a large number of these records stored in the property division, in the original boxes in which they were received from stations.

These records will be properly arranged and classified as soon as the necessary storage room can be obtained.

The official file of the original manuscript weather charts, from the commencement of observations, November 1, 1870, to date, were, at a considerable expenditure of time and labor, completed and 74 volumes sent to the Public Printer to be bound.

The system of classifying and binding, formerly in practice, proved to be very unsatisfactory, and a new method was devised whereby much better results have been obtained. I am much gratified to report that these invaluable charts will soon be in a condition to insure their preservation, and greatly facilitate the means of using them for study. There still remain to be bound 279 volumes, to include June 30, 1888.

The original precipitation charts for each month of the year since the commencement of observations in November, 1870, to December 31, 1887, with blank sheets for

additional records, to include December 31, 1889, have been bound in 12 volumes, arranged by months and years.

A total of 420 volumes of charts and forms were bound during the year, which total includes the binding of 53 volumes of voluntary observer's monthly meteorological reports. These reports had previously been preserved in gummed stub-files, with very little regard to any desirable or convenient arrangement.

Each volume, as now bound, comprises the complete record from the beginning of observations up to and including December, 1887, arranged by States, stations, months, and years, each volume containing one year's record.

Two hundred and twenty-two volumes of forms and charts are still in the hands of the Government Printer.

TORNADO WORK.

During the latter half of the past year, but little attention has been paid to this branch of the division's work.

Twenty-nine new observers were obtained during the year, making the total number of tornado stations throughout the country 2,403.

In the prosecution of this work, 342 reports of the occurrence of tornadoes or other destructive local storms were received, and in connection therewith, 109 letters were received and 308 were sent.

From newspapers and other sources, information was received of the occurrence of tornadoes in localities where this Service has no regular tornado reporter, and 312 letters of inquiry were sent to persons residing in the locality of the reported tornadoes, requesting detailed information concerning the same.

It was formerly the work of this division to abstract such portions of the data as were desired for record and study, which data were entered in special books printed for this purpose and kept on file in the records division. This is no longer done; all reports now received are merely acknowledged and turned over to the officer in charge of the review division for such disposition as he may see fit to make of them. In order to secure a simple, consecutive, and convenient record of these storms I recommend that such extracts be made of the reports received as will afford the desired information, in tabulated form by months and years, and thus preserve the continuity of the record of these phenomena, which have been collected and arranged with the expenditure of much time and labor for a long series of years.

The additional work here suggested would not require, on an average, more than twenty minutes a day for one clerk.

VOLUNTARY OBSERVERS' RECORDS.

In order to render the enormous number of monthly meteorological reports, furnished by the co-operation of voluntary observers, available for the various purposes for which such information is desired, bound books for final record were obtained and 16,797 summaries entered therein.

TEMPERATURE AND PRECIPITATION DATA.

In addition to the monthly summaries prepared from the voluntary records it was found desirable to have the monthly mean temperature and total monthly rain-fall in such shape that the data could be utilized for immediate use. Small forms suitable for binding were therefore prepared, and on April 23, 1888, the work of entering these data was commenced. All voluntary records in the possession of this Service were very carefully examined and the records still further extended by observations made previous to 1874 under the auspices of the Smithsonian Institution, the Surgeon-General U. S. Army, and from other sources, compiled by Mr. Charles A. Schott and published by the Smithsonian Institution.

Of these data there were copied from the records of the voluntary observers of the Signal Service an amount equal to 249,950 months, and from combined records of Schott 494,084 months.

These records will be bound in volumes arranged by States, stations months, and years.

On November 30, 1887, through the courtesy of the Surgeon-General U. S. Army, about 13,000 monthly forms and 356 volumes of bound records, containing meteorological observations made by the Medical Department of the Army were transferred to this Service. The period embraced by these records extends from 1819 to the date of transfer.

A large number of meteorological records were obtained during the year by copying the originals, kindly loaned to this office by persons who had kept a record for a long series of years. This work is still progressing with gratifying results, and in-

formation is being daily received of long records of which this office had no previous knowledge, and which, but for this effort to obtain and publish them, the results of years of personal labor would go for naught and the public be deprived of the value of such information.

Graphic charts of temperature and precipitation, showing thereon all stations west of the one hundredth meridian, having a record of eighteen years or more, and all stations east of the one hundredth meridian having records of twenty-five years or more, have been prepared for purposes of reference, and very materially aid the work of the division.

EXTENSION OF TEMPERATURE AND PRECIPITATION TABLES.

The data obtained from regular Signal Service stations, voluntary observers of the Signal Service, Smithsonian Institution, Surgeon-General's Office, and from miscellaneous sources were further supplemented through the co-operation of the directors of State Weather Services, to whom the above-mentioned combined records were sent for that purpose.

The following States have responded: Missouri, 59 additional stations; Mississippi, 10 additional stations; Louisiana, 14 additional stations; New Jersey, 26 additional stations.

Similar data were forwarded to the local organizations in Kansas and Pennsylvania, but at the close of the fiscal year the reports had not been returned.

WEATHER CABLEGRAMS.

The arrangement entered into in November, 1886, with Prof. E. Mascart, director of the Central Meteorological Bureau of France at Paris, whereby this Service agreed to transmit daily weather dispatches to that city and London, England, has been continued throughout the year with satisfactory success.

The London Meteorological Office discontinued their co-operation in this work on March 1, 1888.

To avoid a seeming duplication of work performed by the Navy Department, the agencies of this Service, maintained for the collection of shipmasters' reports in Boston, New York, and Philadelphia were discontinued, and the systematic collection of simultaneous observations at sea, together with the collection of marine data for the Mascart cablegrams were, on and after October 1, 1887, assumed by the Hydrographic Office of the Navy Department.

This office now receives the reports direct from the branch hydrographic offices by aid of the special-delivery system of the Post-Office Department.

During the year 647 forms containing meteorological observations were received and the data contained thereon charted, enciphered, and cabled each night as formerly.

A few changes were suggested by Professor Mascart during the year relative to enciphering the dispatches, which were carried into effect by this Service.

OBSOLETE FORMS.

The files of the records division are unfortunately and seriously encumbered with a large number of forms that have no practical value. Although considerable time has been spent in their preparation, it necessarily occurs, in the large and varied work of such a Bureau as the Signal Service, that many forms are made to serve but a temporary purpose, and when that is accomplished their usefulness is at an end.

These papers can not be considered records in any sense, because the data upon them have no permanent value.

At the time of the rendering of this report, there are about 1,000,000 of these forms on hand and their number is increasing now at the rate of about 150,000 annually.

It would be a matter of great economy in time, space, and labor if authority could be obtained to destroy these obsolete forms, after their temporary value had expired.

Such action is understood to be comtemplated by the Secretary of War.

METEOROLOGICAL OBSERVATIONS BY THE MEDICAL DEPARTMENT OF THE U. S. ARMY.

After the transfer to this service, on November 30, 1887, of the original meteorological records of the Surgeon General's Office, an arrangement was effected with that Bureau whereby daily meteorological observations were ordered to be made at all military posts where a representative of the Medical Department was stationed, and monthly reports forwarded to Washington for the use of the Signal Service.

By this arrangement the number of reporting stations was increased from 60 to 140.

Co-operation in this matter was further extended through the courtesy of the Surgeon-General U. S. Army, so as to secure more reliable observations, especially of rain and snow-fall, the recording of such data on specially prepared forms, more convenient for examination and filing, and the taking of such observations at such hours as will provide for greater certainty and uniformity in the work.

LETTERS RECEIVED AND SENT.

Five thousand seven hundred and fifty-five letters of all kinds, including those for the autograph signature of the Chief Signal Officer, were sent out from the division.

One thousand six hundred and fifteen were received and entered in the records of the division for action.

Four thousand and three letters were referred to the division for note or action.

NEWSPAPER REPORTS.

In compliance with General Orders Nos. 35 and 70, 1887, the records division receives all newspaper clippings forwarded from regular Signal Service stations, by voluntary observers, and from other sources. There have been received during the past year 19,740 clippings, all of which have been examined and arranged according to subjects.

SPECIAL WORK.

To meet the requirements of the current work of the office, to complete the records of Signal Service stations, and to fill requests for data from various branches of the public service, there have been prepared during the year 158 tables or statements, each table or statement requiring on an average the labor of one clerk for four and a half hours.

For use in courts of law and in the amicable adjustment of suits, there have been prepared and furnished 65 transcripts of Signal Service records, certified under seal of the War Department.

Fifty-one transcripts of Signal Service records, not certified, have been made by observers in charge of stations as authorized by General Orders, No. 4, Signal Office, January 23, 1888, in answer to subpœnas and other requests for information.

Tables and statements of miscellaneous data for use of the general public have been prepared as follows:

For publication, discussion, and research	139
For use in connection with commercial enterprises	145
For use of medical and other professional men in relation to the climatology of the United States	50
Total	334

A list of thirty-six of the most remarkable tornadoes in the United States, giving locality, date, number of persons killed, amount and value of property destroyed, and remarks, was prepared for publication during the year.

Mr. Duncan Beaumont, secretary, office State engineer, Sacramento, Cal., was furnished for publication monthly rain-fall data from 179 stations in the State of California.

Tables of monthly and annual mean temperature for 187 stations in Texas, with tables of precipitation, showing monthly and annual averages, maxima and minima deduced from all available records for 121 stations, were prepared and forwarded to the commissioner of agriculture for the State of Texas.

Messrs. C. C. & C. G. Hine, editors and proprietors of the Insurance Monitor, No. 137 Broadway, New York City, were furnished daily from November 3, 1887, to December 22, 1887, for publication for the benefit of marine people, underwriters, and shipmasters, the following data:

(1) Simultaneous meteorological observations made by vessels plying between Europe and America.

(2) Storms in which the barometer, wind direction, and wind force were given; also the various points through which the wind changed during the storm.

(3) Gales in which the barometer was not reported, but wind direction, wind force, and the points through which the wind changed during the storm were given.

(4) Icebergs, position, date, and description of.

(5) Wrecks, position, date, and description of.

(6) Abandoned vessels, position, date, and description of.

(7) Floating buoys, position, date, and description of.

(8) Derelicts, position, date, and description of.

(9) Fog banks, position of entering and position of clearing.

(10) Miscellaneous phenomena, such as water-spouts, tidal waves, high seas, etc.

(11) Tri-daily reports from Valentia.

(12) Special reports concerning West India cyclones.

(13) Copy of cablegram to Professor Mascart, concerning the atmospheric conditions *over the United States* and the North Atlantic.

DATA FOR USE OF THE UNITED STATES SENATE.

Tabulated statistics of precipitation for the following States and Territories as called for by the United States Senate resolution of January 4, 1888: Washington Territory, Oregon, California, Arizona, New Mexico, Utah, Nevada, Idaho, Wyoming, Colorado, Indian Territory, and Texas, were prepared during the year.

This work comprised the preparation of special forms; the examination and collection of data from every available source; its chronological and geographical arrangement; the determination of latitude, longitude, and elevation of the various stations; the verification of all work, and the copying of the original sheets of data for transmission to the United States Senate. These sheets comprised records varying in length from two to sixty-seven years, at 661 stations, giving for each the average, the greatest, and the least known precipitation for each month and for the year.

In addition to the data above mentioned, monthly departures from the normal were made for 31 stations, having records of observations for eighteen years or more.

From the variety of sources of information and the incompleteness of the record in many instances, the accomplishment of this work was attended with considerable difficulty, and required the services of the greater part of the clerical force of the division during the month of January and a portion of February.

SUGGESTIONS RELATIVE TO THE IMPROVEMENT AND ADVANCEMENT OF THE WORK OF THE RECORDS DIVISION.

To insure greater success in the work undertaken by this division the following special recommendations were prepared and submitted to the Chief Signal Officer:

(1) A card index of voluntary stations and records, arranged by States and stations.

(2) A card index of Signal Service stations and records, arranged by States and stations.

(3) The arrangement and binding of manuscript weather charts from November 1, 1870, to date.

(4) The arrangement and binding of the tri-daily synopses and indications from February 19, 1871, to date.

(5) The arrangement and preservation, under particular subjects, of all newspaper clippings containing meteorological information.

(6) A classified list of unpublished letters and papers relating to the subject of meteorology, compiled from the official records of the office of the Chief Signal Officer.

(7) The arrangement and binding of monthly meteorological reports from voluntary observers, since the commencement of observations.

(8) The preparation of tables of precipitation and temperature from the records of voluntary observers, from all available sources.

(9) A chart of stations having long temperature records; to be used for reference.

(10) A chart of stations having long precipitation records; to be used for reference.

(11) A circular letter to persons who desire to become voluntary meteorological observers of the Signal Service.

(12) A dictionary of meteorological terms, either in use by or known to the Signal Service.

(13) A revision of instructions for cabling weather reports to Europe.

(14) The arrangement and binding of "abstracts of journals" from Signal Service stations.

(15) The arrangement and binding of "original records," Forms No. 101.

(16) Extending the files of the Signal Office to embrace the "original records," Forms 4, from November 1, 1870, to April 30, 1872, inclusive.

(17) A card index for "letters sent" and "letters received," and the appointment of a letter clerk to have charge of the filing and furnishing of all correspondence.

(18) The copying of "abstracts of journals" from July to December, 1887, on Forms No. 140.

(19) To increase the value of river-gauge readings, by obtaining and recording on Forms No. 113 more definite information as to the depth of water in the channel represented by the zero of the gauge.

(20) A recompilation and binding of Forms 127 B.

(21) A recompilation and verification of the data contained on Forms No. 165.

(22) The preparation and use of Forms 128 C by State weather services.

(23) On the employment and exposure of rain-gauges in Arizona and New Mexico.

(24) On the verification of Forms No. 102, self-recording anemometer sheets.

(25) A circular letter to voluntary observers concerning the change in the hours of observation from 7 a. m., 2 p. m., and 9 p. m., to 8 a. m. and 8 p. m., standard time.

(26) For the graphic arrangement of the data received daily by telegraph concerning river changes.

(27) A revision of the nomenclature of clouds.

(28) A modification of Forms No. 103 to provide for recording the daily average velocity of the wind from the various directions recorded.

(29) Concerning compliance with General Orders, Nos. 35 and 70, 1887, relative to the collection and forwarding of newspaper clippings from Signal Service stations.

SPECIAL REPORTS.

Special reports to the number of 16 have been prepared and submitted by order of the Chief Signal Officer on the general work of the Signal Office.

REPORT OF ASSISTANT PROFESSOR H. A. HAZEN.

Duties in general are as follows:

(1) Study of spirit-level and hypsometric elevations of Signal Service and voluntary stations in the United States. Replies to communications regarding all new stations and a study of all changes in elevation, together with a recomputation of all doubtful altitudes. A table giving the elevation of all barometers on January 1, 1886, and all changes that have taken place since then, accompanies this report.

(2) Reduction tables used by the Signal Service and voluntary observers, especially those relating to determination of humidity and reduction to sea-level.

(3) Computation of normals for the use of the indications division. During the year pressure normals for fifteen years and temperature normals for eight years have been completed.

In cases of stations which have been established less than fifteen years it was necessary to make most careful comparisons with neighboring stations in order to reduce all normals to a common epoch. These normals will be found among the tables prepared by this division. It is believed that no further change will be needed in these normals for ten years. A special study has also been made looking to the completion of a normal for 8 a. m. and p. m., to correspond with the new hours of observation adopted July 1, 1888.

In the case of pressure the normal at 7 a. m. and 10 p. m. was found to be entirely satisfactory, bnt for temperature it was found necessary to determine the time of sunrise and sunset at each station and make allowance in accordance with the position of the sun. For example, all stations in a region an hour before sunrise or half an hour after that time could use the 7 a. m. temperature, but a station an hour after sunrise requires the addition of .5 degree to the previous 7 a. m. normal, etc. These new normals will undoubtedly need a slight modification after comparison between the 8 a. m. and p. m. temperatures with the minimum and maximum values.

(4) Preparation of daily charts for 3 p. m. and 10 p. m. The work in connection with these charts consists in first reducing all the lines on the indication-room charts to the size adopted for publication, for the region extending from the Atlantic to the ninety-seventh meridian; next in entering the data from the original records in the remaining region to the Pacific and in drawing lines for this region. These charts have been completed from April 11, 1887, to March 20, 1888.

(5) Preparation of charts showing the mean daily variations in temperature for the United States. These charts have been completed from April to December.

(6) Preparation of charts relative to the amplitudes of the diurnal range in air pressure.

(7) Preparation for indications duty in September, 1887, and writing the indications for October, 1887, January and May, 1888. This work has demanded the careful scrutiny of thousands of charts and does not comprise, by any means, the simple time devoted to the work of preparing indications for three months.

(8) Preparation of special reports from time to time. This has comprised the following as the more important:

(*a*) Report on the proposed new foreign meteorological tables.

(*b*) Report on the revision of Guyot's Tables by the Smithsonian Institution.

(*c*) Report on the extreme storm-wave to be apprehended at Galveston.

(*d*) Report on the relation between the moon and weather.

(*e*) Report on turbid water found just before storms in a Virginia well.

(*f*) Report on the relation between sun-spots and rain-fall.

(*g*) Report on Faye's paper regarding cyclones.

(*h*) Report on the cause of the increase of rain in Florida during July and August.

(*i*) Report on the drought in Michigan.

(*j*) Report on dirrigible balloons.

(*k*) Report on forests of Colorado, for the Agricultural Department.

(*l*) Report on the amount of wind necessary to overturn a railroad car.

(*m*) Report on the rain-fall at stations having a forty years' record with tables.

(*n*) Report on anemometer experiments on a locomotive on the railroad to Baltimore.

(*o*) Report on rain-fall west of the Mississippi river.

(*p*) Report on the cold dip in May, with charts.

(*q*) Report on the influence of forests upon rain-fall.

(*r*) Report on Abercomby's proposed nomenclature of clouds.

(*s*) Report on the relation between the moon and fluctuation in air pressure.

(*u*) Report on long-range predictions for the United States, sent by Herr Waltemath of Germany.

(*v*) Report on an anemogene devised by Roguerie, of Paris.

(*x*) Report on the laws underlying weather changes in the United States.

In addition to these reports letters have been prepared on various subjects, some of which may be given. "Weight of vapor in air;" "Trade-winds;" Zodiacal light;" "Pressure anemometer;" "Sun-spots and air pressure;" "Thermometer shelters;" etc.

(9) Preparation of tables: The more important have been, "Mean monthly pressure and temperature, Canadian stations for review division;" "Tables and charts showing mean weight of vapor per cubic foot of air for June, July, and August, for the United States;" "Table for reduction of pressure to sea-level at very low and high temperatures;" "Table of 10-year normals for review division;" Mean monthly normals for Pacific coast and also the northwestern stations;" "Barometer readings above 31 inches."

(10) Preparation of glossary of meteorological terms, not yet completed.

(11) Preparation for publication of all observations at Pike's Peak and reading proof of same.

(12) Work on anemometer board.

(13) Miscellaneous. Balloon voyage from Philadelphia.

There has been a great deal of routine work during the year that has prevented other and more important studies upon the laws governing the origin, development, and movement of storms. It is becoming very apparent that a closer study and determination of these laws are indispensable, if the science of meteorology is to advance as it should. It is recognized that the United States, with its broad expanse of country stretching over so many degrees of latitude, forms a most inviting and in fact one of the best fields in the world for meteorological inquiry. The observations now taken for more than sixteen years form a most valuable repository of facts which await an opportunity of being arrayed in regular order and arranged to benefit the country by some willing hand.

The following is a summary of that portion of the work of the division for the year which is susceptible of tabulation.

Statement showing the amount of work done in records division during the year ending June 30, 1888.

Voluntary records:	
Summaries made and entered in books	16,797
Rain-fall and temperature data tabulated: number of months record	744,034
Rain-fall and temprature data compared: number of months	89,464
Forms 122 B copied	505
Tables or data for use in Office of Chief Signal Officer:	
Chief Signal Officer	27
Review division	175
Indications division	23
Stations and other divisions	27
Annual Report Chief Signal Officer	29
Data for persons not connected with the public service:	
Certified	65
Not certified	51
Miscellaneous tables and statements	334
Letters—	
Sent:	
Type-written	2,512
Stereotyped	3,243
Received:	
Briefed and entered	1,615
Noted and referred	4,003
Filing and issuing records:	
Received and filed (estimated)	190,000
Issued on requisition	60,000
Returned to file and charge removed	50,000

Cablegram work:	
Reports prepared for transmission	366
Extracts made for "Atlantic ice reports"	216
Copies of messages for Professor Mascart	366
Reports received	647
Tornado work:	
Reports received, acknowledged, and sent, review division	342
Circulars of inquiry sent	620
Proof read:	
Review tables	5
Pages of Annual Report Chief Signal Officer	265
Pike's Peak data, months of	32
Work on 3 and 10 p. m. charts:	
Date entered, number charts and bulletins	1,416
Lines drawn, number charts (estimated)	3,540
Miscellaneous:	
Memorandum slips written	5,000
Corrections on records made	11,097

DATA COMPILED FOR FILE—NUMBER OF ENTRIES.

Means book:	
Entered	55,680
Verified	55,680
Barometer:	
Highest:	
Entered	1,680
Verified	1,680
Computed	1,680
Computation verified	1,680
Lowest:	
Entered	1,680
Verified	1,680
Computed	1,680
Computation verified	1,680
Monthly range:	
Entered	1,680
Verified	1,680
Computed	1,680
Computation verified	1,680
Temperatures:	
Maximum:	
Entered	2,180
Verified	2,180
Computed	2,180
Computation verified	2,180
Minimum:	
Entered	2,180
Verified	2,180
Computed	2,180
Computation verified	2,180
Mean:	
Entered	2,180
Verified	2,180
Computed	2,180
Computation verified	2,180
Tri-daily means:	
Entered	1,800
Verified	1,800
Computed	1,800
Computation verified	1,800
Mean daily range:	
Entered	1,800
Verified	1,800
Computed	1,800
Computation verified	1,800
Temperatures—Continued.	
Mean maximum and mean minimum:	
Entered	2,180
Verified	2,180
Computed	2,180
Computation verified	2,180
Tri-daily, monthly, normal:	
Mean dew point:	
Entered	1,740
Verified	1,740
Computed	1,740
Computation verified	1,740
Mean relative humidity:	
Entered	1,740
Verified	1,740
Computed	1,740
Computation verified	1,740
Monthly precipitation:	
Entered	2,180
Verified	2,180
Computed	2,180
Computation verified	2,180
Clear, fair, cloudy, and rainy days:	
Entered	1,740
Verified	1,740
Computed	1,740
Computation verified	1,740
Average cloudiness:	
Entered	1,740
Verified	1,740
Computed	1,740
Computation verified	1,740
Wind:	
Maximum velocity:	
Entered	1,740
Verified	1,740
Computed	1,740
Computation verified	1,740
Number times observed N., NE., etc:	
Entered	1,740
Verified	1,740
Computed	1,740
Computation verified	1,740

Respectfully submitted.

JNO. P. FINLEY,
Second Lieutenant, Signal Corps, Records Officer.

APPENDIX No. 15.

REPORT OF THE OFFICER IN CHARGE OF THE PUBLICATIONS DIVISION.

SIGNAL OFFICE, WAR DEPARTMENT,
Washington City, July 1, 1888.

SIR: I have the honor to submit the following report of work performed in the publications division during the fiscal year ending June 30, 1888.

PERSONNEL.

Second Lieut. Fielder M. M. Beall relieved Second Lieut. R. B. Watkins, in charge of this division; the former was relieved by Second Lieut. F. R. Day, in charge of the division June 15, 1888.

Mr. John M. Killits, expert editor and proof-reader, resigned October 31, 1887. The draughtsmen (5 in number) have been transferred to the review division. One clerk was discharged; otherwise the force has remained the same as the last report of the officer in charge.

CORRESPONDENCE.

The work of this division has greatly increased since the last report, namely by the addition of keeping a file of letters received, and answering all communications relative to the publications of this service; this certainly entails considerable amount of clerical work on this division that was not performed heretofore, and with only one clerk to do it. It is very often necessary to detail one of the stitchers and folders to assist in the clerical duties of this division when not otherwise engaged.

OFFICE AND STORAGE ACCOMMODATIONS.

As contemplated in the last report of the officer in charge of this division, the removal has taken place, and the printing, lithograph, and distributing rooms now occupy the entire ground floor of No. 1744 G street northwest. While this is a great improvement over premises previously occupied, there is still room for improvement, as the space is entirely too small for the printing, lithograph, and distributing rooms.

DISTRIBUTION OF THE PUBLICATIONS.

Maps.—The 7 a. m. daily weather maps are mailed to the recipients throughout the United States daily, except Sundays and holidays, at 11 a. m.; they were formerly mailed at 4 p. m.; this is an indication of improvement, as the maps will now reach their destination five hours earlier. To the foreign co-operators with this service, they are mailed weekly instead of quarterly, as formerly, thus giving them the benefit of the maps much sooner without any additional expense to this service.

Tri-daily weather-maps.—The publishing of these maps was begun January 1, 1887. They are mailed monthly to the recipients throughout the United States, and every three months to the foreign co-operators with this service, through the International Exchange.

Daily international maps.—The publishing of these maps was commenced in October, 1887, but they contain data as far back as October, 1886. These maps are mailed to the international observers and others co-operating with this service.

Monthly publications.—The Monthly Weather Review has been issued with unusual promptness during the present year; this is partly due to the improved wire-stitching machine and the improved quarters now occupied.

The mailing lists of this publication have been revised during the year, and it is believed that all co-operators with the Signal Service and parties entitled by exchange to this favor now receive the Review promptly. The demands for this publication during the year have been very great, and it is to be regretted that owing to

the limited edition the Chief Signal Officer has been compelled to refuse many of these requests.

Summary and Review.—This publication contains the summary and review of the international meteorological observations, and has been issued as usual to the international observers and others who are entitled to receive the same.

Tri-Daily Meteorological Record.—The Tri-Daily Meteorological Record, containing complete observations at all stations for January, February, March, and April, 1878, of the Signal Service, has been distributed to the directors of the State weather services, Signal Service stations, libraries in the United States, foreign co-operators, and others who are interested in meteorology.

Annual Report of the Chief Signal Officer.—The report for 1886 was distributed to the voluntary observers, State weather observers, Canadian observers, the regular recipients, foreign correspondents, and other parties who have aided the Signal Service in various ways.

Miscellaneous publications.—There has been a number of miscellaneous pamphlets mailed during the present year, such as History of the Signal Service, Memoranda on the Work Accomplished, Danger, Distress, and Storm Signal Codes, General Instructions to Observers of the Signal Service, United States Signal Service Weather Code, Instructions for Voluntary Observers of the Signal Service, Practical Use of Meteorological Reports and Weather Maps, Memoranda of Useful Information for Ship-Masters, and the advance report of the Chief Signal Officer.

Arctic series of publications.—The Arctic series of publications issued in connection with the Signal Service, No. I, Report of the Expedition to Point Barrow, Alaska, and No. II, Contributions to the Natural History of Alaska, by L. M. Turner, the only ones received from the printer, have been distributed to libraries in the United States, foregin governments, directors of State weather services, and voluntary observers of the Signal Service.

Daily bulletin, synopses, probabilities and facts, daily international bulletin, professional papers, Signal Service notes, and the Weekly Weather Chronicle have been judiciously distributed to libraries, agricultural societies, and to such parties that take an interest in meteorology and have made application for them.

Summary of the distribution, etc.

Letters received	1,876
Letters sent	602
7 a. m. daily weather maps	108,119
Tri-daily weather maps	1,410
Daily international maps	3,300
Monthly weather review	44,014
Summary and review	5,468
Tri-daily meteorological record	1,268
Annual reports of the Chief Signal Officer	3,683
Miscellaneous pamphlets	7,513
Contributions to the natural history of Alaska	441
Expedition to Point Barrow, Alaska	278
Daily bulletin, synopses, probabilities, and facts	3,958
Daily international bulletin	3,458
Professional papers of the Signal Service	1,639
Signal Service notes	2,960
Daily Weather Chronicle	238
Total	189,225

I will state that the work of this subdivision (the distributing-room), has been very great during the year in consequence of the large number of publications distributed and their re-arrangement and shelving on account of moving from one building to another, thus entailing a large amount of labor. The work was carried on without seriously interfering with the current work.

PRINTING AND LITHOGRAPH ROOMS.

The following statement shows the amount and kind of press-work performed:

Special orders printed	7,541
General orders printed	26,269
Special bulletins printed	15,815
Instructions	4,898
Circulars printed	23,875
Monthly weather reviews printed	31,100
Summary and review printed	6,600

Wrappers printed	90,000
Letter-heads printed	200,500
Letters	21,439
Envelopes printed	584,200
Forms printed	459,975
Miscellaneous printed	55,152

LITHOGRAPH ROOM.

The following statement shows the amount and kind of lithograph work performed:

Base maps printed	321,509
7 a. m. daily weather maps printed	108,919
Monthly weather review maps printed	134,610
Summary and review maps printed	10,600
Tri-daily weather maps printed	39,475
International maps printed	33,200
Circular letters printed	3,500
Forms and drawings printed	45,129
Miscellaneous printed	47,154

The work performed by this subdivision is of high character.

The improved press facilities put in during the year have added to the rapidity with which the work is now performed.

The total number of employés in the division at the close of the year is 21, consisting of 18 enlisted men and 3 civilians, classed as follows:

Clerk	1
Foreman of printing	1
Proof-reader	1
Printers	7
Lithographers	4
Pressman	1
Assistant pressmen and feeders	2
Feeder and assistant to lithographer	1
Engineer	1
Stitchers and folders	2

I am, very respectfully, your obedient servant,

F. R. DAY,
Second Lieutenant, Signal Corps, Publications Officer.

The CHIEF SIGNAL OFFICER.

APPENDIX No. 16.

REPORT OF PROPERTY AND DISBURSING DIVISION.

SIGNAL OFFICE, WAR DEPARTMENT,
Washington City, July 9, 1888.

SIR: I have the honor to submit the following statement of the work of the property division for the fiscal year ending June 30, 1888:

PERSONNEL.

No changes of importance have occurred in the personnel of the division since last report.

SALES OF PUBLICATIONS.

Three hundred and fifty-six dollars and one cent have been received during the year from sales of maps and bulletins, as allowed by act of Congress approved March 30, 1874, section 227, Revised Statutes. The amount received was deposited with the Treasurer of the United States to the credit of the appropriation "observation and report of storms."

MUSTERING OFFICE.

Under instructions No. 38, Signal Office, 1887, Second Lieut. R. B. Watkins, Signal Corps, was detailed as mustering officer, relieving Second Lieut. W. D. Wright, Signal Corps. Lieutenant Watkins was succeeded on April 23, 1888, by First Lieut. R. E. Thompson, Sixth Infantry, acting signal officer, who remained in charge to the end of the fiscal year.

The total number of accounts examined and prepared for settlement during the year was 21,933, being an independent account for each month of the year for each enlisted man, for each of the several appropriations for pay, for commutation of rations, for commutation of quarters, and for commutation of fuel.

OTHER ACCOUNTS SETTLED.

The number of accounts growing out of the disbursements of the various appropriations expended by this office, settled during the year, was 8,287, distributed as follows:

July, 1887	509	Jan., 1888	700
Aug., 1887	816	Feb., 1888	822
Sept., 1887	659	Mar., 1888	617
Oct., 1887	1,047	Apr., 1888	649
Nov., 1887	898	May, 1888	476
Dec., 1887	737	June, 1888	357

SUSPENSIONS OF ACCOUNTS.

During the year two "Difference Sheets" have been received, covering vouchers aggregating, one $175 and the other $50.40; satisfactory explanations were made to both.

There are now no "Difference Sheets" outstanding and I have been informed, by letters from the Third Auditor of the Treasury, that all of my accounts covering the appropriations for 1885, for 1886, and for 1887 have been closed, to include February, 1887, a period of twenty months.

INSTRUMENTS PURCHASED FOR OFFICIAL USE AND ISSUED.

Two thousand and two instruments of various kinds have been purchased during the year for the use of this service, and two thousand three hundred and eight instruments have been issued since last report.

AVERAGE COST OF MAINTAINING STATIONS OF OBSERVATION.

The average cost of maintaining each regular meteorological station during the year (exclusive of the cost of telegraph service and the pay and allowances of the enlisted force on duty at each) has been $279.64. The station costing the least was Raleigh, N. C., $2 only being expended thereat during the year; the station costing the most was Chicago, Ill., at which the sum of $895.87 was spent during the year.

CORRESPONDENCE.

The total number of letters received during the year was 30,301, containing 60,183 inclosures.

The total number of letters sent was 31,266, which included 2,200 indorsements.

SHIPMENTS.

In the packing and shipping room there were 12,921 distinct shipments made through the Quartermaster's Department by mail and by express.

There were 5,124 letters and parcels sent by registered mail.

PACKAGES RECEIVED.

Packages by mail	1,381
Packages by express	401
Packages by freight	1,870
Packages through the Quartermaster's Department	338
Local consignments	1,196

MACHINE-SHOP.

The usual quantity of work has been done in the machine-shop in the manufacture and repair of instruments and in repairs about the office. It, however, has been your policy to confine such work to small jobbing and repairs and to have all large jobs done outside, after due advertisement and an opening of bids; this being also rendered necessary owing to the limited force employed in the shop and the character of the work to be done.

CARPENTER-SHOP.

In the carpenter-shop almost all the boxes for shipment of supplies are made and jobbing and repairs about the office are done, and the men employed therein have been kept busy during the year at such work.

During the year the plan was tried of having the packing-boxes made in lots of various sizes by outside parties, under due advertisement and the opening of bids, and it is believed that the result has demonstrated the wisdom of such a course and the advisability of continuing the practice.

LIBRARY.

The library has received during the year, by purchase, exchange, or gift, 475 volumes, and now contains 10,320 volumes, exclusive of pamphlets, which, although catalogued, have never been numbered as books.

On June 5, 1888, Mr. O. L. Fassig was appointed bibliographer and librarian, relieving Sergeant G. W. Merrill.

APPROPRIATIONS.

The condition of the appropriations (disbursed by this office) for the fiscal year ending June 30, 1888, with the expenditures thereunder and the balances, with probable demands on such balances, report of which is required to be rendered by the act of Congress approved May 20, 1820, is as follows:

Appropriated:	
Observation and report of storms	$288,518.75
Signal Service:	
Regular supplies	57,151.85
Incidental expenses	772.00
Transportation	23,300.00
Barracks and quarters	85,440.00
Subsistence	148,000.00
Medical Department	3,200.00
Signal Service of the Army	8,000.00

Expended:	
Observation and report of storms	$177,564.52
Signal Service:	
Regular supplies	*53,638.42
Incidental expenses	178.68
Transportation	*17,858.80
Barracks and quarters	82,712.11
Subsistence	143,464.00
Medical Department	2,527.90
Signal Service of the Army	1,897.59
Balances:	
Observation and report of storms	110,954.23
Signal Service:	
Regular supplies	3,513.43
Incidental expenses	593.32
Transportation	5,141.20
Barracks and quarters	2,727.89
Subsistence	4,789.00
Medical Department	672.30
Signal Service of the Army	6,102.41
Probable demands:	
Observation and report of storms	95,500.00
Signal Service:	
Regular supplies	500.00
Incidental expenses	15.00
Transportation	5,000.00
Barracks and quarters	150.00
Subsistence	150.00
Medical Department	600.00
Signal Service of the Army	6,072.02

Of the appropriations "without year," the amounts expended therefrom, the balances on hand, and the probable demands are shown, as follows:

Appropriated:	
Establishing signal station, Point Jupiter, Fla	$17,000.00
Repair Signal-Service cable, Columbia River	5,500.00
Expended:	
Establishing signal station, Point Jupiter, Fla	16,031.13
Repair Signal-Service cable, Columbia River	449.50
Balances:	
Establishing signal station, Point Jupiter, Fla	968.87
Repair Signal Service cable, Columbia River	5,050.50
Probable demands:	
Establishing signal station, Point Jupiter, Fla	14.00
Repair Signal-Service cable, Columbia River	4,978.43

Amounts appropriated under the different heads for the support of the Signal Service, U. S. Army, for the fiscal year ending June 30, 1888.

Legislative, executive and judicial:		
Regular clerks and messengers		$10,660.00
Scientific experts, clerks, etc		30,000.00
Rent of buildings for Signal Office		7,500.00
Printing and binding		10,000.00
Postage-stamps (allotted by Secretary of War)		800.79
Stationery (allotted by Secretary of War)		3,873.32
Contingent expenses (allotted by Secretary of War)		7,085.42
		69,919.53
Sundry civil expenses—Observation and report of storms:		
Manufacture, purchase, etc., of instruments	$10,000.00	
Telegraphing reports	138,000.00	
Expenses storm-signals	11,600.00	
Sea-coast telegraph lines	15,944.00	
Cotton-region reports	7,000.00	
Instrument shelters	2,000.00	
Rents, etc., of offices outside of Washington	40,000.00	
River and flood reports	10,000.00	
Maps and bulletins	25,000.00	
Maintenance and repair of military telegraph lines	24,000.00	
Construction telegraph line San Francisco to Pt. Reyes	4,974.75	
		288,518.75

* Includes settlements made in the Treasury.

Establishing signal station, Point Jupiter, Florida		$17,000.00
Repair of Signal-Service cable, Columbia River		5,500.00
Pay, etc., of the Signal Corps:		
Pay of officers	$34,180.00	
Pay of enlisted men	180,000.00	
Commutation of quarters to officers	5,500.00	
Mileage to officers	4,000.00	
		223,680.00
Subsistence Department:		
Subsistence and commutation of rations, Signal Corps		148,000.00
Quartermaster's Department, Signal Service:		
Regular supplies—		
Fuel for offices and for sales to officers	$6,000.00	
Commutation of fuel to enlisted men	47,760.00	
Forage for public animals	1,805.65	
Forage for officers' horses	1,365.00	
Straw for public animals	112.00	
Straw for officers' horses	109.20	
		57,151.85
Incidental expenses—		
Shoeing public animals	$288.00	
Shoeing officers' horses	234.00	
Blacksmith's supplies	100.00	
Veterinary supplies	50.00	
		672.00
Interment of officers and men		100.00
Signal Service:		
Transportation—		
Materials and funds	$15,000.00	
Men	8,000.00	
Harness, and repairs to means of	300.00	
		23,300.00
Barracks and quarters		85,440.00
Medical Department:		
Medical attendance and medicines to officers and men		3,200.00
Signal Service of the Army		8,000.00
Grand total		930,482.13

NOTE.—The foregoing statement includes amounts appropriated in deficiency act approved February 1, 1888. (Public No. 4.)

CLERICAL FORCE.

On July 1, 1887, there were employed in this division 75 employés, 47 enlisted men, and 28 civilians; the 75 employés being distributed as follows: Clerks, 29 enlisted men and 3 civilians; mechanics, messengers, and laborers, 18 enlisted men and 25 civilians.

On June 30, 1888, there were employed in this division 73 employés, 40 enlisted men, and 33 civilians, the 73 employés being distributed as follows: Clerks, 25 enlisted men and 5 civilians; mechanics, messengers, and laborers, 15 enlisted men and 28 civilians.

SEA-COAST TELEGRAPH.

Offices in operation and reporting direct to the Chief Signal Officer on July 1, 1887, 13. All offices were transferred on August 1, 1887, to Lieut. W. D. Wright, Signal Corps.

Receipts from July 1, 1887, to August 31, 1887, on which latter date I made my final account-current on account of sea-coast telegraph, are as follows:

July	$67.64
August	64.91
Total (deposited credit United States Treasurer)	132.55

MILITARY TELEGRAPH.

The number of offices in operation and reporting direct to the Chief Signal Officer on July 1, 1887, was 36.

The offices closed during the year were Fort Spokane, Wash., and Spokane Falls, Wash.

Offices transferred during the year to Lieut. J. A. Swift, Signal Corps:

Ashland, Oregon.	Fort Bidwell, Cal.	Linkville, Oregon.
Astoria, Oregon.	Fort Klamath, Oregon.	Neah Bay, Wash.
Bly, Oregon.	Lakeview, Oregon.	Pysht, Wash.

Offices transferred during the year to Lieut. J. H. Weber, Signal Corps:

Bismarck, Dak.	Fort Elliott, Tex.	Fort Yates, Dak.
Brownsville, Tex.	Fort Laramie, Wyo.	Glendive, Mont.
Cantonment, Ind. T.	Fort Maginnis, Mont.	Lakota, Dak.
Carter, Wyo.	Fort Reno, Ind. T.	Lava, N. Mex.
Custer, Mont.	Fort Robinson, Nebr.	Marfa, Tex.
Fort Bridger, Wyo.	Fort Sill, Ind. T.	Poplar River, Mont.
Fort Buford, Dak.	Fort Stanton, N. Mex.	Rio Grande City, Tex.
Fort Custer, Mont.	Fort Supply, Ind. T.	
Fort Davis, Tex.	Fort Totten, Dak.	

Receipts from July 1, 1887, to February 29, 1888, on which latter date I made my final account-current on account of line receipts, military telegraph, are as follows:

Month.	Amount.	Month.	Amount.
July	$390.83	January	$36.28
August	330.31	February	11.97
September	283.44		
October	304.14	Total (deposited to credit United States Treasurer)	1,617.88
November	191.93		
December	68.98		

The number of miles of telegraph line sold during the year was 351$\frac{7}{16}$; amount received for same, $930.10. Number of miles of telegraph line transferred to the Life-Saving Service, 140.

FORMS.

The work of estimating for forms and issuing them, for the great variety of work carried on by the Signal Service, which not only includes forms for the several divisions of the office of the Chief Signal Officer and the regular meteorological stations, but for voluntary observers, State weather services, displaymen, cotton-belt observers, special river and rainfall observers, thunder-storm and tornado reporters, military telegraph lines, and acting signal officers, was, in November, 1887, assigned by your orders to one clerk; and the whole stock of blanks was thoroughly overhauled and many forms found to be obsolete eliminated, and the numerous forms of the several classes were gathered together and properly arranged.

The number of requisitions filled has been 1,835. The number of packages sent out by mail has been 4,184.

CONTRACTS.

As required by the act of Congress approved April 21, 1808 (Statutes at Large, vol. 2, p. 435), I submit herewith list of contracts made by me during the fiscal year ending June 30, 1888:

With whom made.	For what purpose.	With whom made.	For what purpose.
E. E. Rider	Furnishing stationery.	Western Electric Co	Cable, at Columbia River, Oregon.
Wm. Ballantyne & Son	Do.	Thos. C. Basshor & Co	Boiler and engine.
Easton & Rupp	Do.	Charles J. Cary & Co	Weather symbols, etc.
Thomas G. Hood	Do.	Avil Printing Company	Forms No. 106 bb.
William A. Wheeler, jr	Do.	Charles J. Cary & Co	Bed-plates, etc.
Cyclostyle Company	Do.	Crane & Co	Flags.
Newall & Jones	Furnishing fuel.	M. G. Copeland & Co	Do.
L. D. Geneste	Furnishing furniture.	Bulkley, Raiguel & Co	Paper, etc.
W. B. Moses & Son	Do.	Wm. Ballantyne & Son	Do.
B. F. Guy	Do.	Hutchinson-Williams Livery Company	Forage.
Frank J. Eakin	Furnishing fuel.	D. M. Tate	Do.
Dennis Crowley	Do.	J. T. Harper	Do.
G. A. Booker & Co	Do.	Edward Drinkwater	Do.
C. J. McRae & Co	Do.	A. J. Stowe	Do.
John A. Midgett	Furnishing forage.	E. J. Griffith & Co	Printing presses.
John A. Roebling's Sons & Co	Furnishing wire.	Crane & Co	Heliographs.
A. D. Pitts	Building house at Point Jupiter light-house, Fla.	The E. S. Greeley & Co	Telegraph supplies.
The E. S. Greeley & Co	Cables, at Martha's Vineyard, Mass.	James B. Lambie	Do.
		J. U. Burket & Co	Do.
		E. Morrison	Stationery.

With whom made.	For what purpose.	With whom made.	For what purpose.
Thomas G. Hood	Stationery.	William J. C. Dulany	Stationery.
James R. Michael	Do.	William A. Wheeler, jr.	Do.
Henry Menken	Do.	Wm. Ballantyne & Son.	Do.
Callahan & Gartlan	Do.	Morgan Envelope Co	Do.
Easton & Rupp	Do.	D. W. Glass	Do.
Rider & Addison	Do.		

PROPERTY RESPONSIBILITY.

During the fiscal year ending June 30, 1887, an effort was made to transfer to the enlisted men of the Signal Corps the absolute responsibility for all public property at the stations at which said men might be serving, and thus relieve the property and disbursing officer of carrying on his returns vast quantities of property, most of which he had never seen. The plan submitted was in analogy to that in force in the Ordnance Department. The matter was submitted to the honorable the Secretary of War, who referred it to the Judge Advocate-General for an opinion, and that officer, while fully realizing the fact that the disbursing officer of this service should be relieved, yet felt constrained to decide against the plan, for the reason that Congress alone, by special legislation, could transfer the responsibility for public property to an enlisted man.

On March 8, 1888, the matter was again brought to the attention of the War Department, and a draught of an act (analogous to section 1167 of the Revised Statutes, which governs in the Ordnance Department) was submitted, with the request that the matter might be brought to the attention of Congress; the War Department most favorably considered the request, and a bill (H. R. No. 9907) was, on May 8, 1888, reported by Mr. Townshend, from the Committee on Military Affairs, which will, if passed, bring about the desired result.

OFFICE AND STORAGE ACCOMMODATIONS.

I have the satisfaction of reporting that the repeated requests made to Congress for office and storage accommodations have at last been heeded. On February 25, 1888, H. R. No. 4359 was passed, appropriating the sum of $150,000 for the purchase of a site (the northeast corner of square No. 25, bounded on the north by M street, on the east by Twenty-fourth street, and south and west by the grounds of the Columbia Hospital), including the building thereon, for the erection of the necessary storehouses for the use of the office of the Chief Signal Officer. The erection of the additional buildings required is now in progress under the direction of the Supervising Architect of the Treasury Department, and it is hoped that the removal to the new quarters may soon be effected.

METHODS OF BUSINESS.

It is proper that I make some allusion to the changes in the methods which have been suggested, and, with your hearty approval, put in operation in this division during the year, by which it is believed the fiscal business of the office is disposed of with the greatest degree of correctness and promptness with the least expenditure of time and labor.

(1) Abolishing the sending of vouchers to the examiner's office for entry, prior to payment.

(2) Changing the method of issuing letters of authority, requiring them in all cases to be signed by the Chief Signal Officer or by the officer temporarily acting in his stead.

(3) The issuing, at the beginning of a fiscal year, of a special order covering all fixed charges.

(4) Discontinuing the entry of accounts received in the letters-received book, and in lieu thereof the opening of a bill book.

(5) Adopting a special form of receipt for property shipped, thus avoiding the additional invoicing of such property.

(6) The adoption of a special form for inventory and inspection report, thus enabling observers to drop *at once* property inspected and condemned by inspectors.

(7) Changing method of payment for commutation of fuel, commutation of quarters, and commutation of rations; adopting a form of receipt similar to that used by the Pay Department.

(8) Rendering by the property and disbursing officer of a semi-annual return of property in lieu of quarterly returns.

(9) The consolidation of the various kinds of property on one return of Signal Service property.

(10) Discontinuing the practice of sending letters of transmittal with checks.

(11) Discontinuing the making of copies of accounts-current and abstracts of purchases and expenditures for the office files, the information being accessible in the records of the office in other shape sufficient for all necessary purposes of reference.

(12) The designation on the accounts-current and abstracts of purchases and expenditures the title of each appropriation, as printed in italics in the annual "Digests of Appropriations," in lieu of using all the sub-titles of such appropriations, thus saving much unnecessary work.

(13) The omission of the name of the payee of a voucher from the abstracts of purchases and expenditures, the number and amount of the voucher being considered a sufficient identification of the account.

(14) The abolition of the useless briefing and notations on the back of vouchers.

There have been other recommendations made and adopted, but the enumeration of them in detail would require more time and space than I consider it proper to spare at this time, especially as those mentioned are sufficient to indicate the character and extent to which, under your administration, the work of reform has been carried.

RECOMMENDATIONS.

I can not permit this opportunity to pass without inviting attention to a few suggestions having in view a more efficient and economical administration of the public business.

(1) The present rules in regard to bids require that they be submitted in duplicate; abstracts of proposals are also required to be made in duplicate, and in a large number of cases the cost of the clerical work required to prepare the papers equals, if it does not exceed, the cost of the article or service for which the advertisement was got out, besides involving delays of from ten to thirty days. If the approval of the War and Treasury Departments can be obtained, I would suggest that where the amount involved is $50 or less, the mode of purchase or employment be left to the discretion of the disbursing officer or the officer required to make the purchase or secure the service.

(2) I would also suggest that in no case bids be called for in duplicate, one copy of the bids, one copy of the abstracts being all that is necessary for the security of the Government or the protection of the disbursing officer; the abstracts to be filed in the Treasury Department at the end of the fiscal year, or when the last voucher incurred under them has been paid; in the mean time the certificate of the officer on the voucher (if it passes the administrative scrutiny of the head of the bureau) as to the facts in the case to be sufficient. No accounts should be suspended for merely hypercritical or technical reasons, as the suspension of an account for such reasons often places the disbursing officer in a most embarrassing position. To accomplish this, I would recommend this matter be submitted for the approval of the War and Treasury Departments.

(3) Under present rules, five copies of each contract have to be made, and they are disposed of as follows: (1) One copy to the party of the first part, (2) one copy to the party of the second part, (3) one copy to the proper Comptroller of the Treasury, (4) one copy to the head of the bureau, and (5) one copy to the returns office of the Interior Department, and this is the rule, no matter whether the amount involved is $500 or $500,000, and in my judgment one or more of these copies could be dispensed with without impairing in the least degree the security of the Government. In fact, my experience has been that in the majority of cases an offer and acceptance is a sufficient protection to the Government, and the making of five copies of contracts for small amounts is a useless formality, involving time and labor with no corresponding benefit.

(4) I would also recommend that the entry of letters received in record books be discontinued, as the numbering of such letters in regular sequence, and the keeping of copious index books of names, places, and subjects (all of which are now kept), would seem to be sufficient for all practical purposes.

(5) Under the present organization of the Signal Service, it seems to me much confusion results from the fact that there are no less than three different disbursing officers, under the direction of independent chiefs, who disburse the various appropriations, and I would suggest that steps be taken to have the disbursement of all the appropriations made for the support of the service placed under the disbursing officer detailed for duty with the Bureau, for economical reasons, if no other.

(6) All accounts of the Signal Service should also go for examination to the same Auditor and Comptroller, and not some to one set of accounting officers and some to

another. At present all medical accounts go to the Second Auditor and Second Comptroller, while all others go to the Third Auditor and Second Comptroller; the result is that an entire distinct set of papers, vouchers, abstracts, and accounts-current have to be made solely for the medical vouchers.

(7) It is suggested in submitting the estimates for the fiscal year ending June 30, 1890, that Congress be asked to consolidate the several sub-appropriations under the general appropriation "Observation and report of storms," appropriating one aggregate sum thereunder, in lieu of the present plan of making a dozen or more small specific appropriations. It is believed that under the plan suggested a much more efficient and, I really believe, economical service can be secured.

(8) So long as a military force is maintained, it is suggested that any moneys for pay, for commutation of quarters, for commutation of fuel, and for commutation of rations be appropriated under one general head, to be designated "Signal Service pay, etc.," and that the amount be disbursed by one disbursing officer, by one check, monthly, to each man entitled thereto, on one set of properly certified vouchers.

(9) Attention is invited to the fact that there are no less than six different rates in force for the various commutations of rations, of quarters, and of fuel for the enlisted men of the Signal Corps; and, in my opinion, an effort should be made to equalize these allowances and have one uniform rate established under each of the several commutations—thus, for commutation of rations $30 per month, for commutation of quarters $20 per month, and for commutation of fuel $9 per month—for the reason that there should be no difference in the pay of the men of the Corps, no matter at what station serving, except that caused by rank and length of service, which is now established and regulated by law.

(10) It is also recommended that action be taken to secure to enlisted men of the Signal Corps, when traveling, a fixed and definite rate for expenses, in lieu of subsistence, etc., and for that purpose I would suggest the following draft of a proposed proviso, to be inserted in the next appropriation for transportation:

"Enlisted men of the Signal Corps, when traveling under competent orders, changing stations, or inspecting special stations and other detached duty in connection with the Signal Service, shall be entitled to transportation in kind, or, if no transportation be furnished, to a re-imbursement of the cost thereof, actually paid by them for travel fare by the usual conveyance, inclusive of transfer to and from railway stations, not exceeding 50 cents for each transfer, and of one berth in sleeping-cars, or on steamers (when an extra charge is made therefor). They will also be entitled to re-imbursement for the actual cost of meals and rooms in hotels and eating-houses, not to exceed $3 per diem for each and every day unavoidably consumed in travel, or while on duty under the orders, including all absolutely necessary delays. The re-imbursement or compensation under the orders shall be in lieu of any commutation of rations, commutation of quarters, and commutation of fuel to which the men would otherwise have been entitled during the period required in obeying the orders."

(11) With a view of reducing unnecessary work, I have the honor to suggest that the "return of property," now rendered quarterly by observers, be hereafter rendered semi-annually. This change will save the examination of over three hundred returns each year.

(12) Attention is invited to the fact that there are at present in this office no less than five record divisions, each having a separate and distinct series of numbered letters. Such a system can only result in confusion, and I renew the suggestion I made some time ago, that a record division be established, under an efficient clerk, consolidating so much of the work of the several divisions as relates to the receipt and disposition of letters received.

STATUS OF WORK.

The work of the entire division is well up to date, and I most cheerfully commend the clerks and employés of the division for the faithful and efficient manner in which they have performed the duties assigned to them. The exigencies of the service have required the relief of some clerks during the year, and in some cases special report had to be made of the inefficiency of others.

Under section 194 of the Revised Statutes I have the honor to report that the services of none of the clerks can be dispensed with without detriment to the public service, and I consider that the removal of any individuals, and the appointment of others in their stead (except in cases already specially brought to your attention), as not required for the better dispatch of business.

I am, very respectfully, your obedient servant,

F. B. JONES,
Captain and A. Q. M., U. S. A., P. and D. Officer, Signal Service.

The CHIEF SIGNAL OFFICER.

APPENDIX No. 17.

Monthly and yearly meteorological summaries at stations of the Signal Service, U. S. Army.

ABILENE, TEX.

[Latitude, 32° 14′ N.; longitude, 99° 43′ W.]

Months and year.	Pressure.			Temperature.								Dew point.				Relative humidity.				Precipitation.	
	Mean.	Maximum.	Minimum.	7 a. m.	3 p. m.	10 p. m.	Mean.	Maximum.	Minimum.	Mean. Maximum.	Mean. Minimum.	7 a. m.	3 p. m.	10 p. m.	Mean.	7 a. m.	3 p. m.	10 p. m.	Mean.	Total.	Max. 24 hours.
	In.	In.	In.	°	°	°	°	°	°	°	°	°	°	°	°					In.	In.
J ..	28.236	28.77	27.82	35.3	52.3	43.4	43.7	83	6	57.9	31.5	23	22	22	22	64	34	47	48	0.06	0.06
F ..	28.286	28.69	27.87	41.3	54.8	50.5	48.9	81	11	63.0	37.6	31	27	33	30	70	45	58	58	1.21	0.65
M ..	28.230	28.55	27.90	48.5	68.3	60.6	59.1	91	34	73.7	47.0	32	31	33	32	54	28	37	40	0.03	0.03
A ..	28.150	28.54	27.78	55.6	73.8	66.4	65.3	99	38	78.5	53.8	44	41	45	43	67	35	50	51	2.45	1.10
M ..	28.151	28.40	27.81	63.8	80.4	73.9	72.7	100	45	83.9	62.4	54	52	54	54	74	42	55	57	3.95	1.60
J ..	28.128	28.30	27.86	70.6	86.8	78.4	78.6	101	60	89.5	68.6	62	61	61	61	76	44	58	59	3.26	2.32
J ..	28.198	28.35	28.06	74.9	92.2	84.6	83.9	101	65	95.5	73.4	64	63	63	63	70	40	50	53	2.71	1.14
A ..	28.150	28.31	28.00	73.8	88.4	81.5	81.2	98	63	91.2	72.3	65	66	65	66	76	48	60	61	1.10	0.50
S ..	28.221	28.36	28.04	69.4	81.8	76.5	75.9	93	49	84.5	67.2	63	63	64	63	80	56	67	68	2.64	1.20
O ..	28.268	28.60	27.83	54.9	68.8	61.4	61.7	90	34	71.4	52.2	49	51	51	50	82	55	71	70	4.77	3.27
N ..	28.285	28.67	27.99	44.7	61.5	51.5	52.6	80	13	63.8	41.6	40	45	43	42	83	56	74	71	0.87	0.78
D ..	28.238	28.69	27.77	35.4	46.0	39.5	40.3	69	11	49.9	30.9	32	36	35	35	88	71	86	81	1.58	0.56
Y ..	28.212	28.77	27.77	55.7	71.3	64.0	63.7	101	6	75.2	53.2	47	46	48	47	74	46	59	60	24.63	.....

ALBANY, N. Y.

[Latitude, 42° 39′ N.; longitude, 73° 45′ W.]

J ..	29.953	30.66	29.25	18.2	24.0	20.5	20.9	50	-15	31.8	10.2	13	16	13	14	79	71	74	75	3.02	0.60
F ..	30.127	31.00	29.13	22.0	27.8	25.8	25.2	43	2	33.9	16.6	16	21	19	19	79	75	76	77	2.86	0.52
M ..	29.879	30.77	29.17	24.0	33.0	27.4	29.1	46	4	35.9	19.2	19	24	21	21	80	70	77	76	2.90	1.45
A ..	29.912	30.62	29.05	38.4	49.5	41.6	43.2	72	18	52.5	33.9	31	36	35	34	75	62	77	71	2.49	0.75
M ..	29.958	30.27	29.45	59.2	74.0	62.9	65.4	87	42	76.3	54.1	52	60	57	56	77	62	82	74	2.27	1.02
J ..	29.923	30.28	29.61	64.4	75.5	67.1	69.0	94	52	78.6	58.7	56	57	59	57	74	55	77	69	2.99	1.56
J ..	29.879	30.09	29.53	72.5	82.9	74.5	76.6	95	61	86.0	68.2	66	66	67	66	79	58	79	72	4.61	1.61
A ..	29.909	30.26	29.58	63.0	75.9	66.5	68.5	90	48	78.0	59.5	58	57	58	58	83	55	75	71	4.61	1.44
S ..	30.022	30.39	29.38	53.6	66.8	57.5	59.3	82	38	68.9	50.3	48	54	51	51	83	66	78	76	1.94	0.99
O ..	29.939	30.47	29.41	44.9	55.3	48.1	49.4	71	26	58.0	41.6	38	42	41	40	78	62	77	72	2.22	1.10
N ..	29.940	30.86	29.29	35.0	42.8	36.4	38.1	65	11	46.0	30.0	28	30	28	29	75	62	74	70	4.36	1.13
D ..	30.021	30.95	29.22	25.5	30.7	26.4	27.5	46	-1	33.5	21.1	21	24	20	21	85	76	76	79	5.43	1.52
Y ..	29.956	31.00	29.05	43.4	53.2	46.2	47.6	95	-15	56.6	38.6	37	40	39	39	79	65	77	73	39.70	.....

ALPENA, MICH.

[Latitude, 45° 5′ N; longitude, 83° 30′ W.]

J ..	29.234	29.86	28.35	11.3	17.0	12.1	13.7	47	-16	22.5	4.2	8	13	8	10	84	82	84	84	5.02	1.09
F ..	29.444	30.20	28.43	12.3	20.0	16.2	16.4	48	-15	24.8	6.7	8	16	12	12	84	82	84	84	4.60	1.22
M ..	29.386	30.06	28.77	15.2	25.2	19.5	20.0	45	-8	28.6	11.0	10	18	15	14	80	74	81	78	1.22	0.44
A ..	29.282	29.87	28.49	32.5	38.9	35.7	35.7	75	9	44.7	28.4	28	30	30	30	84	72	82	79	2.66	0.76
M ..	29.346	29.66	28.92	51.6	57.9	52.9	54.1	83	35	65.7	45.6	45	47	46	46	78	69	79	76	2.63	1.04
J ..	29.343	29.77	28.93	58.9	63.7	60.9	61.2	88	44	68.4	52.9	54	54	55	54	84	72	82	79	2.20	0.71
J ..	29.312	29.58	28.93	65.1	72.0	66.8	68.2	91	44	77.3	59.7	60	60	60	60	84	68	80	77	5.16	1.42
A ..	29.371	29.64	29.11	56.3	67.6	61.0	61.6	93	40	70.3	52.3	51	53	53	52	84	61	76	74	1.09	0.71
S ..	29.438	29.81	28.84	48.0	60.4	53.1	53.8	82	28	62.9	44.0	44	48	46	46	86	65	77	76	2.14	0.93
O ..	29.307	29.80	28.64	38.4	46.6	42.0	42.3	75	15	49.5	33.0	34	36	35	35	84	68	78	77	3.88	1.30
N ..	29.331	30.26	28.62	31.2	36.2	33.0	33.5	64	7	39.5	27.7	26	28	27	27	82	75	81	79	2.71	0.84
D ..	29.354	30.17	28.76	25.0	28.6	27.0	27.1	54	6	31.2	22.0	23	25	24	24	90	86	90	88	4.57	0.89
Y ..	29.345	30.26	28.35	37.2	44.7	40.0	40.6	93	-16	48.8	32.5	32	36	34	34	84	73	81	79	37.88	.....

NOTE.—This appendix contains data from form 127 for the year ending December 31, 1887. All observations are in columns immediately underneath. Large *H* represents the height of the barometer above sea-level; *Letters of* the alphabet opposite any data denote number of days missing from the record.

APPENDIX No. 17.

Monthly and yearly meteorological summaries at stations of the Signal Service, U. S. Army.

ABILENE, TEX.

[*H*=1748. *T*=64. *h*=53.]

Cloudiness (in tenths).				Wind.													Number of days—										
7 a. m.	3 p. m.	10 p. m.	Mean.	Total (miles).	Maximum.	Direction.	Prevailing direction.	North.	Northeast.	East.	Southeast.	South.	Southwest.	West.	Northwest.	Calms.	Clear.	Fair.	Cloudy.	Foggy.	Rain or snow.	Max. below 32°.	Min. below 32°.	Max. above 90°.	Thunder-storms.	Auroras.	Months and year.
2.4	3.0	2.2	2.5	12,017	42	NE.	SW.	14	10	0	0	9	41	8	11	0	19	10	2	0	1	2	15	0	0	0	J.
5.6	5.8	4.7	5.4	9,284	46	NW.	SW.	7	19	4	6	14	24	4	6	0	9	10	9	0	6	1	10	0	0	0	F.
3.8	2.7	2.4	3.0	10,164	36	SW., N	SW.	12	28	4	0	8	30	6	4	1	17	10	4	0	1	0	0	1	1	0	M.
4.4	4.2	3.2	3.9	10,270	48	NW.	SW.	5	12	7	7	25	27	3	4	0	11	15	4	0	7	0	0	4	8	0	A.
5.6	5.1	4.4	5.0	8,645	52	W.	S.	7	11	9	12	31	15	5	3	0	7	18	6	0	9	0	0	6	10	0	M.
2.9	5.0	3.8	4.2	7,948	52	SE.	S.	3	4	7	12	49	12	0	3	0	11	16	3	0	8	0	0	10	13	0	J.
3.4	5.1	2.6	3.7	7,448	41	SW.	S.	1	3	7	16	31	29	5	1	0	15	14	2	0	6	0	0	27	11	0	J.
4.5	5.1	2.7	4.1	7,147	30	SE.	S.	3	9	6	10	43	19	0	3	0	13	12	6	0	5	0	0	20	8	0	A.
4.7	5.6	2.5	4.3	7,089	36	NW.	S.	5	15	11	6	28	18	2	4	1	11	15	4	0	6	0	0	9	2	0	S.
3.3	3.1	3.0	3.1	8,295	36	SW.	SW.	10	26	0	3	16	31	3	3	1	19	6	6	0	6	0	0	0	0	0	O.
4.0	3.6	3.2	3.6	6,782	42	N.	SW.	7	21	0	0	16	41	3	2	0	16	8	6	0	3	1	5	0	1	0	N.
4.7	4.7	3.8	4.4	8,668	40	N.	NE., S.	16	19	2	1	19	17	5	14	0	13	10	8	0	8	3	16	0	0	0	D.
4.2	4.4	3.2	3.9	103,757	...	.....	SW.	90	177	57	73	289	304	44	58	3	161	144	60	0	66	7	46	77	54	0	Y.

ALBANY, N. Y.

[*H*=85. *T*=79. *h*=99.]

6.5	7.2	5.7	6.5	5,404	33	S.	S.	10	4	1	5	30	1	8	25	9	4	16	11	0	13	13	30	0	0	1	J.
6.9	6.7	6.4	6.7	5,421	32	W.	NW.	15	2	1	10	13	2	17	18	6	6	8	14	0	15	10	26	0	0	0	F.
6.6	5.5	5.0	5.7	6,566	26	W.	NW.	18	4	1	12	10	2	17	28	1	5	16	10	0	9	10	30	0	0	0	M.
5.3	5.4	4.7	5.1	5,066	24	W., S.	NW.	16	4	1	12	15	2	16	23	1	9	12	9	0	11	0	12	0	0	0	A.
4.1	4.1	2.9	3.7	3,655	23	SE.	S.	13	12	2	15	22	0	7	9	13	15	11	5	0	8	0	0	0	4	0	M.
6.1	6.1	5.1	5.8	3,450	21	SE.	S.	11	11	3	14	22	2	13	8	6	5	13	12	0	11	0	0	2	5	0	J.
5.7	5.8	4.8	5.4	3,690	36	S.	S.	7	5	1	15	35	0	11	6	13	5	13	8	0	15	0	0	6	4	0	J.
5.3	5.4	2.2	4.3	3,133	24	S., W.	S.	9	14	1	8	24	1	8	12	16	10	16	5	0	8	0	0	0	0	0	A.
5.5	6.1	4.1	5.2	3,636	24	S.	S.	12	3	1	9	27	3	10	16	9	7	15	8	0	12	0	0	0	1	0	S.
6.0	7.7	5.7	6.5	3,942	36	S.	S.	6	5	1	9	29	3	10	20	10	5	12	14	0	9	0	6	0	0	0	O.
6.8	6.3	5.3	6.1	5,006	30	N.	S	11	4	0	8	25	6	15	20	1	6	12	12	0	11	2	17	0	0	0	N.
6.5	6.7	5.7	6.3	4,328	27	NW.	NW.	15	4	1	8	15	1	7	32	10	5	13	13	0	15	13	27	0	0	0	D.
5.9	6.1	4.8	5.6	53,306	...	.....	S.	143	72	14	125	267	23	139	217	95	82	162	121	0	137	48	148	8	14	1	Y.

ALPENA, MICH.

[*H*. =609. *T*=63. *h*=54.]

9.0	8.2	5.6	7.6	7,588	38	SE.	W.	9	4	4	5	13	9	30	18	1	1	14	16	0	22	25	31	0	0	0	J.
7.3	8.4	6.3	7.3	6,789	38	E.	W.	3	3	13	17	2	2	37	7	0	1	13	14	0	17	21	28	0	0	2	F.
6.8	5.3	3.7	5.3	7,524	31	NW.	NW.	4	2	8	15	4	1	23	32	4	8	15	8	0	10	22	31	0	0	2	M.
5.7	7.6	5.5	6.3	6,632	32	SW.	SE.	3	2	19	23	10	6	15	8	4	3	17	10	0	15	1	18	0	2	1	A.
4.0	3.8	3.6	3.8	4,941	34	SW.	SE.	7	8	11	24	6	2	15	7	13	13	11	7	0	10	0	0	0	5	0	M.
4.1	5.9	4.8	4.9	4,702	26	E.	SE.	7	4	10	25	5	2	17	5	15	10	15	5	0	13	0	0	0	4	1	J.
4.7	5.3	3.9	4.6	5,372	36	W.	SE.	6	1	12	22	7	8	15	16	6	9	15	7	0	14	0	0	1	6	1	J.
5.2	5.1	3.7	4.7	5,423	29	SE.	W.	7	11	6	17	6	4	28	13	1	8	17	6	0	7	0	0	1	3	0	A.
4.7	5.6	2.7	4.3	5,817	42	W.	W.	4	2	8	18	8	9	26	15	0	11	13	6	1	9	0	2	0	2	3	S.
7.1	7.3	5.9	6.8	8,302	39	W., E.	W.	4	0	5	10	11	16	36	10	1	3	14	14	0	13	0	13	0	0	1	O.
7.6	7.7	6.6	7.3	7,653	36	NW., W.	NW.	6	4	10	10	10	12	17	20	1	3	9	18	0	13	4	22	0	0	0	N.
9.6	8.5	8.9	8.8	7,789	39	SE.	W.	6	5	8	15	13	14	18	13	1	0	7	24	0	21	16	28	0	0	0	D.
6.3	6.6	5.1	6.0	78,532	...	.....	W.	66	46	114	201	95	85	277	164	47	70	160	135	1	164	89	173	2	22	11	Y.

servations are by seventy-fifth meridian time. Appropriate headings show the data contained in the *T* the height of thermometer above ground; and small *h* the height of the rain-gauge above ground.

Monthly and yearly meteorological summaries—Continued.

ASTORIA, OREGON.

[Latitude, 46° 57′ N.; longitude, 124° W.]

Months and year.	Pressure.			Temperature.								Dew point.				Relative humidity.				Precipitation.	
	Mean.	Maximum.	Minimum.	7 a. m.	3 p. m.	10 p. m.	Mean.	Maximum.	Minimum.	Mean. Maximum.	Mean. Minimum.	7 a. m.	3 p. m.	10 p. m.	Mean.	7 a. m.	3 p. m.	10 p. m.	Mean.	Total.	Max. 24 hours.
	In.	In.	In.	°	°	°	°	°	°	°	°	°	°	°	°					In.	In.
J	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	18.24	2.85
F	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	8.51	2.11
M	.....	.....	.....	43.1	48.6	47.3	46.3	66	30	51.9	41.7	40	42	42	41	90	79	82	84	16.11	3.16
A	30.072	30.47	29.56	43.5	49.9	48.0	47.1	61	35	52.9	42.9	40	42	41	41	88	74	79	80	6.83	1.19
M	30.028	30.34	29.50	48.5	56.4	55.5	53.5	86	36	62.0	47.4	44	47	47	46	86	76	75	79	7.33	1.62
J	30.053	30.31	29.72	51.5	58.5	58.1	56.0	84	46	62.6	51.3	44	48	47	46	75	67	68	70	0.63	0.37
J	30.118	30.29	29.91	53.5	61.4	60.5	58.5	75	44	64.8	53.5	48	53	53	51	81	76	76	77	0.72	0.58
A	30.012	30.30	29.86	55.0	61.9	60.9	59.3	77	48	65.5	54.8	50	55	54	53	82	78	80	80	0.49	0.15
S	30.009	30.31	29.69	52.6	60.2	57.9	56.9	80	47	64.3	52.5	48	53	53	51	84	76	84	81	4.82	2.70
O	30.120	30.43	29.58	49.6	55.6	54.0	53.1	71	42	59.6	49.4	46	49	50	48	87	80	85	84	3.66	1.12
N	30.020	30.43	29.54	42.7	47.5	46.4	45.5	60	30	50.2	42.1	39	43	42	41	86	84	86	86	8.11	2.29
D	29.919	30.60	29.19	41.0	44.6	43.6	43.1	55	32	46.9	40.1	38	42	40	40	88	90	89	89	16.64	3.17
Y	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	92.09	.....

ATLANTA, GA.

[Latitude, 33° 45′ N.; longitude, 84° 23′ W.]

J	28.959	29.32	28.54	33.9	45.1	39.9	39.6	69	9	48.5	31.1	29	31	32	31	83	62	74	73	3.52	1.20
F	29.051	29.46	28.55	48.3	57.9	51.8	52.7	74	29	60.6	45.2	47	51	48	48	91	79	87	86	3.74	1.06
M	28.871	29.22	28.61	44.1	57.6	50.4	50.7	75	25	61.5	41.2	40	46	43	43	85	69	78	77	1.99	0.90
A	28.900	29.31	28.40	53.6	70.8	63.7	62.7	8[illegible]	36	73.1	50.3	42	42	41	42	66	39	46	50	1.38	0.04
M	28.859	29.12	28.63	64.9	80.5	70.7	72.0	89	57	82.3	61.9	67	60	58	58	78	50	66	65	1.76	1.08
J	28.884	29.11	28.66	68.8	83.7	75.3	75.9	97	57	85.8	65.9	60	61	62	61	75	48	65	63	2.82	1.12
J	28.870	29.06	28.63	72.6	83.4	76.7	77.6	100	59	85.6	70.0	69	69	70	69	88	65	79	77	14.11	3.51
A	28.835	29.05	28.64	70.6	82.8	75.1	76.2	91	55	84.8	68.2	66	65	66	66	86	57	75	73	7.51	2.37
S	28.934	29.12	28.62	64.6	79.5	72.3	72.1	95	45	80.6	61.8	58	56	57	57	78	47	60	62	4.20	1.95
O	28.907	29.12	28.63	53.1	66.4	59.2	59.6	82	30	68.3	50.6	46	46	46	46	79	52	65	65	3.22	1.37
N	28.965	29.35	28.50	44.9	60.4	52.3	52.5	72	16	62.3	41.9	36	37	38	37	73	46	60	60	0.30	0.16
D	28.939	29.43	28.30	38.3	46.8	41.7	42.3	65	15	48.9	34.5	32	34	34	33	78	64	76	73	5.79	1.47
Y	28.914	29.46	28.30	54.8	67.9	60.8	61.2	100	9	70.2	51.9	48	50	50	49	80	56	69	69	50.40	.....

ATLANTIC CITY, N. J.

[Latitude, 39° 22′ N.; longitude, 74° 25′ W.]

J	30.036	30.62	29.40	29.1	34.7	30.4	31.4	49	7	38.2	23.9	25	28	26	26	86	77	82	82	3.50	1.34
F	30.194	30.93	29.32	33.9	39.4	36.4	36.6	58	17	43.9	30.9	30	32	32	31	87	75	85	83	4.17	1.86
M	29.933	30.72	29.13	32.5	40.1	34.3	35.6	56	18	42.9	29.1	29	30	30	30	86	70	84	80	2.94	0.83
A	29.986	30.63	29.23	43.7	50.7	44.6	46.3	84	27	54.1	40.0	40	42	41	41	86	74	88	83	2.85	1.19
M	30.035	30.31	29.60	57.3	63.3	56.7	59.1	73	47	66.2	53.9	54	55	54	54	88	75	91	85	1.61	0.45
J	30.004	30.30	29.65	64.5	70.0	63.8	66.1	95	54	73.5	60.3	60	62	61	61	87	76	90	84	4.21	1.99
J	29.980	30.21	29.66	73.4	79.6	73.0	75.3	97	65	82.8	70.2	71	72	71	71	91	78	93	87	1.95	1.12
A	29.974	30.26	29.72	68.8	75.4	69.6	71.3	88	54	78.5	65.7	65	66	66	66	89	75	89	84	3.08	0.98
S	30.101	30.43	29.63	60.0	67.9	62.3	63.4	78	40	69.8	57.4	57	61	59	59	92	79	90	87	3.12	1.30
O	30.011	30.45	29.50	52.5	59.8	54.1	55.5	77	34	62.8	48.8	50	55	52	52	92	86	92	90	3.39	2.32
N	30.051	30.72	29.44	40.9	48.7	42.5	44.0	64	23	50.8	37.4	39	45	39	41	92	88	89	90	2.58	0.80
D	30.096	30.86	29.18	33.6	40.7	35.9	36.7	56	14	44.7	28.8	29	34	31	31	84	78	83	82	4.51	1.18
Y	30.033	30.93	29.13	49.2	55.9	50.3	51.8	97	7	59.0	45.5	46	48	47	37	88	78	88	85	37.91	.....

AUGUSTA, GA.

[Latitude, 33° 28′ N.; longitude, 81° 54′ W.]

J	29.992	30.39	29.60	35.1	49.9	40.3	41.8	74	15	53.1	31.6	32	35	36	34	90	61	84	78	3.87	0.91
F	30.069	30.53	29.55	49.2	61.8	53.5	54.8	77	31	65.1	46.5	47	5	50	49	91	72	88	84	2.95	0.78
M	29.860	30.31	29.50	43.7	63.9	51.8	53.1	83	29	67.1	41.1	40	46	45	41	88	56	80	74	0.64	0.32
A	29.888	30.33	29.36	52.9	75.2	62.0	63.4	93	29	77.2	49.2	48	51	51	50	83	45	68	65	2.77	1.48
M	29.835	30.15	29.55	66.5	84.0	70.6	73.7	94	46	87.0	62.6	62	62	62	62	84	49	75	70	1.61	0.51
J	29.839	30.09	29.60	72.2	87.9	76.5	78.9	103	59	90.4	67.9	66	65	66	66	81	49	73	68	4.79	1.96
J	29.832	30.05	29.62	77.0	89.5	79.0	81.8	104	69	93.5	73.3	72	74	73	73	86	61	82	77	8.83	4.58
A	29.803	30.03	29.52	73.5	86.5	76.5	78.8	99	60	90.2	70.7	71	72	71	71	91	64	84	79	6.83	2.26
S	29.924	30.11	29.60	66.2	83.9	71.4	73.8	98	45	85.4	64.0	62	61	63	62	85	48	74	69	0.81	0.63
O	29.891	30.15	29.54	54.5	72.2	60.5	62.4	88	39	73.8	52.0	51	52	53	52	88	53	78	73	6.58	1.90
N	29.966	30.39	29.50	43.8	65.0	51.4	53.4	78	24	66.2	41.3	40	42	43	42	86	46	74	69	0.77	0.40
D	29.959	30.49	29.36	41.8	54.3	46.5	47.5	72	24	55.3	38.4	36	38	38	37	81	57	73	70	4.61	1.30
Y	29.905	30.53	29.36	56.4	72.8	61.7	63.6	104	15	75.4	53.2	52	54	54	53	86	55	78	73	45.09	.....

Monthly and yearly meteorological summaries—Continued.

ASTORIA, OREGON.

[H = 20. T = 39. h = 55.]

Cloudiness (in tenths).				Wind.													Number of days—									
7 a. m.	8 p. m.	10 p. m.	Mean.	Total (miles).	Maximum.	Direction.	Prevailing direction.	North.	Northeast.	East.	Southeast.	South.	Southwest.	West.	Northwest.	Calms.	Clear.	Fair.	Cloudy.	Foggy.	Rain or snow.	Max. below 32°.	Min. below 32°.	Max. above 90°.	Thunder-storms.	Auroras.	Months and year.
...	...	...	...	.....	..	.....	.....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	J.
...	...	...	...	.....	..	.....	.....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	F.
7.9	7.2	7.3	7.5	6,076	32	SW.	SW.	0	12	13	13	2	47	5	00	1	3	11	17	0	23	0	1	0	0	0	M.
8.6	7.7	7.8	8.0	5,569	32	SW.	SW.	1	7	9	8	7	32	6	20	0	1	8	21	0	21	0	0	0	0	0	A.
7.5	6.6	6.2	6.8	5,854	24	SW., SE.	SW.	0	10	5	4	7	46	10	11	0	6	10	15	0	12	0	0	0	0	0	M.
8.4	7.2	4.9	6.8	5,132	20	NW.	SW.	1	5	2	5	0	31	20	17	0	3	13	14	0	8	0	0	0	0	0	J.
8.2	5.5	4.7	6.1	5,264	19	NW., W.	SW.	0	0	0	3	1	44	33	12	0	7	12	12	0	5	0	0	0	0	0	J.
7.9	7.0	7.2	7.4	4,287	20	W., NW., S. W.	SW.	0	2	3	1	0	45	18	24	0	4	8	19	0	6	0	0	0	1	0	A.
5.1	4.8	5.0	5.0	4,359	30	S. W.	SW.	0	10	3	7	6	29	15	19	1	9	10	11	0	11	0	0	0	0	0	S.
7.0	5.3	4.4	5.6	4,246	24	NE., NW., SE.	NE.	0	25	10	10	6	23	7	11	1	7	11	13	0	13	0	0	0	0	0	O.
6.8	6.6	5.3	6.2	5,006	30	SW., NE.	NE.	0	25	20	20	2	20	0	1	2	6	9	15	0	16	0	2	0	0	0	N.
7.8	8.4	7.8	8.0	6,602	48	SW.	SW.	0	30	4	12	4	39	3	1	0	4	3	24	0	24	0	0	0	0	0	D.
...	...	...	...	.....	..	.....	.....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	Y.

ATLANTA, GA.

[H = 1,129. T = 83. h = 74.]

4.7	4.4	3.7	4.3	8,666	32	NW., W.	NW.	2	4	9	10	15	16	13	23	1	11	14	6	0	12	3	15	0	1	0	J.
5.4	7.8	5.6	6.3	7,560	38	W.	W.	0	3	15	13	8	16	17	12	0	5	13	10	1	16	0	5	0	2	0	F.
2.4	5.3	3.2	3.6	8,825	30	NW.	W.	2	2	9	6	7	6	32	28	1	15	11	5	0	10	0	4	0	1	0	M.
3.2	4.0	2.2	3.1	7,913	37	W.	NW.	2	3	12	10	8	11	20	24	0	17	9	4	0	8	0	0	0	1	0	A.
5.0	7.5	4.2	5.6	6,008	34	W.	SE.	6	9	10	19	9	5	17	18	0	4	19	8	0	11	0	0	0	7	0	M.
4.1	5.9	4.2	4.7	6,561	28	E.	E.	6	9	22	5	1	6	21	20	0	10	12	8	0	7	0	0	7	7	0	J.
6.3	7.0	5.3	6.2	5,853	36	NW.	W.	3	5	8	14	10	13	35	5	0	3	17	11	0	17	0	0	6	7	0	J.
4.4	5.5	3.8	4.6	4,738	35	NW.	NW.	5	10	17	9	9	7	16	20	0	11	16	4	0	12	0	0	5	5	0	A.
4.2	5.1	2.6	4.0	6,150	25	SE., S.	E.	9	11	25	16	6	6	10	7	0	14	12	4	0	8	0	0	3	1	0	S.
4.0	4.7	3.3	4.0	7,104	28	NW.	NW.	3	9	23	9	3	3	15	28	0	15	8	8	0	9	0	1	0	0	0	O.
4.0	4.0	3.8	3.9	6,553	30	W.	SE.	0	4	14	20	6	11	17	18	0	14	9	7	0	4	0	3	0	0	0	N.
6.3	7.5	5.9	6.6	8,026	33	W.	E.	0	2	34	7	2	3	16	29	0	7	9	15	0	13	0	11	0	0	0	D.
4.5	5.7	4.0	4.7	83,957	..	.....	NW.	38	71	198	138	84	103	229	232	2	126	149	90	1	127	3	39	21	32	0	Y.

ATLANTIC CITY, N. J.

[H = 34. T = 52. h = 42.]

4.2	5.2	3.7	4.4	7,212	32	SW.	SW.	9	5	5	3	4	28	14	25	0	12	11	8	0	9	9	23	0	0	0	J.
4.4	6.2	3.9	4.8	7,123	32	SE.	SW.	13	12	5	5	5	16	12	15	1	8	14	6	0	15	2	16	0	0	0	F.
4.7	5.1	3.1	4.3	8,327	30	NE., SE.	NW.	11	9	10	4	3	8	5	39	4	12	13	6	1	14	0	20	0	0	0	M.
3.8	5.6	3.6	4.3	7,033	37	NE.	NW.	1	12	11	6	6	18	11	24	1	11	13	6	0	13	0	4	0	1	0	A.
2.5	2.6	2.8	2.6	5,188	36	E.	S.	2	10	15	10	26	15	7	5	3	17	11	3	0	8	0	0	0	3	0	M.
4.0	4.2	2.6	3.6	6,265	32	NE.	S., SW	5	16	12	7	18	18	8	3	3	16	7	7	0	10	0	0	1	3	0	J.
3.3	4.3	1.8	3.1	5,314	25	SE.	SW.	1	6	8	12	20	29	9	6	2	17	11	3	0	6	0	0	3	4	0	J.
4.1	4.7	2.1	3.6	5,216	34	E.	SW.	13	10	13	5	15	18	8	7	4	13	16	2	0	18	0	0	0	7	0	A.
4.9	4.8	3.7	4.5	5,379	24	NE.	SW.	15	4	9	10	10	20	6	13	3	12	11	7	1	13	0	0	0	1	0	S.
6.0	6.3	5.2	5.8	5,704	48	E., NE.	SW.	15	9	6	1	4	21	13	16	8	10	7	11	0	11	0	0	0	0	0	O.
5.3	5.3	3.7	4.8	5,759	54	N.	NW.	11	3	1	5	3	22	11	31	3	9	15	6	0	8	0	5	0	0	0	N.
6.3	5.2	3.4	5.0	6,359	48	W.	W.	16	9	5	7	7	2	23	22	2	8	16	7	0	14	3	20	0	0	0	D.
4.5	5.0	3.3	4.3	74,879	..	.....	SW.	112	105	100	75	121	215	127	206	34	145	145	75	2	139	14	88	4	19	0	Y.

AUGUSTA, GA.

[H = 183. T = 45. h = 40.]

3.9	4.9	3.5	4.1	3,374	19	NW.	W.	9	9	5	10	17	6	18	9	10	16	7	8	0	9	1	19	0	0	0	J.
4.4	8.6	6.1	6.4	2,958	24	SW.	NE.	5	18	3	8	6	12	11	3	18	3	15	10	0	14	0	1	0	2	0	F.
3.4	4.2	3.0	3.5	3,214	29	W.	W.	4	7	6	6	5	10	31	19	5	16	10	5	0	5	0	6	0	1	0	M.
2.7	4.3	1.9	3.0	2,985	23	S., SW.	W.	7	6	7	9	17	15	21	5	3	18	10	2	0	6	0	1	1	1	0	A.
4.1	6.5	6.1	5.6	2,676	23	E.	SE.	7	15	9	19	12	7	9	9	6	6	15	10	0	10	0	0	7	7	0	M.
3.4	5.6	5.8	4.8	2,939	19	S.	NE.	6	21	6	6	18	6	14	5	8	12	10	8	0	10	0	0	17	5	0	J.
4.9	8.8	6.9	6.9	2,439	23	NE.	S., SW	1	14	13	8	18	18	5	7	9	2	15	14	0	16	0	0	25	4	0	J.
4.7	6.4	5.1	5.4	2,478	18	NE.	NE.	11	26	9	9	5	3	10	14	6	9	12	10	0	12	0	0	18	5	0	A.
3.5	5.4	2.7	3.9	2,658	22	N.	NE.	8	27	12	14	10	5	3	4	7	14	10	6	0	4	0	0	8	0	0	S.
3.7	5.1	4.2	4.3	2,678	18	N.	N.	18	16	5	5	10	4	11	15	9	14	7	10	0	11	0	0	0	0	0	O.
3.3	3.1	2.8	3.1	2,148	30	NE.	NE.	6	20	4	7	8	12	13	9	11	15	11	4	0	3	0	3	0	0	0	N.
6.3	7.0	6.5	6.6	2,872	20	NE.	NE.	7	25	8	4	6	11	19	8	5	6	9	16	0	11	0	7	0	0	0	D.
4.0	5.8	4.5	4.8	33,419	..	.....	NE.	89	204	87	105	132	109	165	107	97	131	131	103	0	111	1	37	76	25	0	Y.

Monthly and yearly meteorological summaries—Continued.

BALTIMORE, MD.

[Latitude, 39° 18′ N.; longitude, 76° 37′ W.]

Months and year.	Pressure.			Temperature.								Dew point.				Relative humidity.				Precipitation.	
	Mean.	Maximum.	Minimum.	7 a. m.	3 p. m.	10 p. m.	Mean.	Maximum.	Minimum.	Mean. Maximum.	Mean. Minimum.	7 a. m.	3 p. m.	10 p. m.	Mean.	7 a. m.	3 p. m.	10 p. m.	Mean.	Total.	Max. 24 hours.
	In.	In.	In.	°	°	°	°	°	°	°	°	°	°	°	°					In.	In.
J ..	30.023	30.62	29.42	28.9	36.6	31.8	32.4	65	7	40.3	25.1	22	23	22	22	78	61	67	68	2.57	1.02
F ..	30.180	30.86	29.35	35.0	42.2	37.3	38.2	72	21	46.5	32.2	27	28	28	28	75	63	73	70	4.60	1.60
M .	29.953	30.70	29.40	33.8	42.2	37.4	37.8	57	21	45.4	31.2	23	24	24	24	66	52	63	61	3.49	1.22
A ..	29.973	30.60	29.27	45.9	57.6	50.1	51.2	85	30	61.2	41.8	36	36	36	36	69	48	60	59	2.44	0.85
M .	29.989	30.28	29.57	62.7	73.8	65.6	67.4	87	51	76.6	58.9	54	54	56	55	76	53	73	67	2.57	0.78
J ..	29.970	30.31	29.60	67.7	78.9	70.3	72.3	94	52	81.3	63.0	58	58	60	59	72	52	71	65	4.44	1.43
J ..	29.935	30.16	29.67	76.4	86.4	78.2	80.3	102	67	88.9	73.2	69	67	70	68	76	56	76	70	8.32	2.77
A ..	29.951	30.24	29.69	69.0	79.3	71.6	73.3	91	55	82.0	66.2	62	62	64	62	78	57	77	71	4.15	1.76
S ..	30.080	30.40	29.59	59.9	70.6	63.5	64.7	88	42	73.0	57.4	53	53	55	54	78	57	75	70	2.80	0.83
O ..	30.012	30.44	29.53	51.4	61.7	54.6	55.9	85	32	64.8	48.5	43	41	43	42	73	50	67	63	1.06	0.76
N ..	30.053	30.79	29.44	40.6	51.1	43.7	45.1	69	25	53.3	37.9	31	30	30	31	70	48	61	60	2.02	0.80
D ..	30.096	30.88	29.37	34.1	41.2	36.2	37.2	59	16	43.0	30.9	26	26	28	27	72	58	72	68	5.04	1.16
Y ..	30.018	30.88	29.27	50.4	60.1	53.4	54.6	102	7	63.0	47.2	42	42	43	42	74	55	70	66	43.59	.....

BISMARCK, DAK.

[Latitude, 46° 47′ N.; longitude, 100° 38′ W.]

J ..	28.123	28.83	27.51	-10.8	- 2.4	- 6.6	- 6.6	44	-44	9.3	-18.6	-12	- 4	- 8	- 8	96	94	96	95	0.95	0.29
F ..	28.300	28.93	27.68	- 9.1	0.9	- 2.7	- 3.6	45	-43	8.1	-13.3	-10	- 2	- 4	- 5	95	89	95	93	0.52	0.18
M .	28.275	28.90	27.66	19.6	29.4	25.7	24.9	54	-16	38.0	15.7	18	23	22	21	92	79	86	86	0.78	0.58
A ..	28.098	28.51	27.51	34.6	50.7	43.1	42.8	87	12	56.3	32.5	30	31	33	32	85	51	70	69	1.52	0.57
M .	28.116	28.73	27.69	49.8	67.4	59.8	59.0	91	26	74.6	46.5	44	48	47	46	82	52	65	66	2.19	0.79
J ..	28.120	28.44	27.82	58.7	77.6	69.3	68.5	97	38	82.1	56.0	53	54	56	54	82	45	64	64	0.85	0.39
J ..	28.189	28.37	27.95	60.4	79.4	70.7	70.2	96	50	82.9	57.8	56	58	58	57	86	49	67	67	4.49	1.35
A ..	28.190	28.48	27.69	56.3	72.6	64.8	64.6	91	37	76.0	54.3	52	57	56	55	88	59	75	74	1.62	0.43
S ..	28.232	28.63	27.72	48.6	66.4	57.4	57.5	85	28	69.7	45.5	44	48	47	46	84	54	70	70	1.35	0.64
O ..	28.243	28.69	27.67	33.0	48.6	40.6	40.7	73	2	52.9	29.6	29	33	31	31	85	58	71	72	1.15	0.53
N ..	28.234	28.69	27.71	20.6	38.2	26.4	28.4	73	-25	41.9	14.4	16	22	18	19	84	56	74	71	0.11	0.04
D ..	28.224	28.79	27.76	5.7	13.9	8.5	9.4	47	-25	20.1	- 2.5	3	9	6	6	90	81	91	88	0.80	0.24
Y ..	28.195	28.93	27.51	30.6	45.2	38.1	38.0	97	-44	51.0	26.5	27	31	30	30	87	64	77	76	16.38	.....

BLOCK ISLAND, R. I.

[Latitude, 41° 10′ N.; longitude, 71° 36′ W.]

J ..	29.984	30.60	29.23	29.6	34.2	30.3	31.4	56	2	39.6	23.0	26	30	27	28	86	85	88	86	6.96	2.41
F ..	30.156	30.92	29.19	29.8	34.3	32.8	32.3	54	12	40.5	26.8	27	29	29	29	90	82	87	86	7.02	1.82
M .	29.852	30.74	28.95	31.0	37.1	33.1	33.7	54	17	40.0	28.2	27	30	28	28	86	75	81	81	4.49	1.41
A ..	29.932	30.64	29.12	40.5	46.7	42.3	43.2	67	25	49.7	38.1	35	37	37	37	82	71	82	78	3.49	0.88
M .	30.040	30.33	29.58	53.7	60.1	55.6	55.8	77	44	62.3	50.1	49	51	49	50	85	74	86	82	0.51	0.29
J ..	29.996	30.29	29.63	60.4	65.1	59.6	61.7	80	49	67.6	56.3	56	58	56	57	87	79	89	85	2.75	1.10
J ..	29.955	30.20	29.56	70.3	74.6	69.4	71.4	83	59	76.9	66.8	68	70	67	68	91	85	92	89	7.52	3.40
A ..	29.946	30.28	29.65	66.9	72.1	66.5	68.5	82	49	74.0	63.2	63	64	62	63	87	78	88	84	3.13	1.94
S ..	30.060	30.43	29.55	59.5	64.8	60.2	61.5	74	47	66.5	56.6	54	57	56	56	84	78	86	83	2.60	1.12
O ..	29.977	30.46	29.41	52.2	56.6	53.5	54.1	70	36	59.7	49.3	46	49	48	48	82	77	81	80	2.28	1.28
N ..	29.990	30.76	29.30	43.7	47.7	44.4	45.3	60	20	50.4	38.4	38	40	37	38	82	75	78	78	1.68	0.77
D ..	30.035	30.87	28.86	36.1	39.0	36.8	37.3	58	13	41.8	30.5	33	32	31	32	89	79	82	83	2.70	0.88
Y ..	29.994	30.92	28.86	47.8	52.7	48.5	49.7	83	2	55.8	43.9	44	46	44	45	86	78	85	83	44.55	.....

BOISÉ CITY, IDAHO.

[Latitude, 43° 37′ N.; longitude, 116° 8′ W.]

J ..	27.193	27.61	26.65	33.3	39.1	36.1	36.2	55	16	43.7	28.4	29	30	29	29	83	70	77	77	2.89	0.86
F ..	27.092	27.63	26.63	25.6	33.2	31.5	30.1	53	6	38.5	21.6	22	24	24	23	86	70	75	77	1.13	0.30
M .	27.279	27.58	26.94	38.8	53.9	50.0	47.6	74	24	58.8	35.0	32	31	34	32	78	45	56	60	1.33	0.55
A ..	27.145	27.52	26.76	40.5	56.0	51.5	49.3	86	22	61.3	36.8	32	31	34	32	73	42	52	56	1.54	0.69
M .	27.141	27.46	26.76	47.4	68.3	65.3	60.3	97	26	76.7	43.8	38	41	41	40	73	40	44	52	0.51	0.24
J ..	27.087	27.40	26.67	50.3	70.0	68.0	62.8	95	38	79.6	47.7	43	44	46	44	78	43	49	57	1.58	0.51
J ..	27.158	27.33	26.91	58.4	83.0	80.1	73.8	100	41	90.1	54.2	44	44	45	44	61	26	30	39	0.12	0.08
A ..	27.073	27.27	26.82	56.0	80.4	75.2	70.5	97	39	87.1	51.0	41	44	42	42	58	30	33	40	0.29	0.24
S ..	27.175	27.40	26.90	50.0	73.1	66.5	63.2	93	32	81.3	45.0	38	40	38	39	67	32	38	46	0.14	0.14
O ..	27.313	27.64	26.82	39.9	60.3	51.3	50.5	87	16	68.4	34.4	30	31	32	31	70	35	48	51	0.03	0.02
N ..	27.296	27.56	26.98	30.2	48.7	39.0	39.3	72	6	54.7	25.3	22	26	26	25	73	46	62	60	0.04	0.04
D ..	27.275	27.72	26.53	28.4	36.7	32.8	32.6	53	9	40.1	24.6	23	26	26	25	83	67	77	76	1.74	0.56
Y ..	27.186	27.72	26.53	41.6	58.6	53.9	51.4	100	6	65.0	37.3	33	34	35	34	74	46	54	58	11.34	.....

***Monthly and yearly meteorological summaries*—Continued.**

BALTIMORE, MD.

[H=45. T=75. h=69.]

Cloudiness (in tenths).				Wind.													Number of days—										
7 a. m.	3 p. m.	10 p. m.	Mean.	Total (miles).	Maximum.	Direction.	Prevailing direction.	North.	Northeast.	East.	Southeast.	South.	Southwest.	West.	Northwest.	Calms.	Clear.	Fair.	Cloudy.	Foggy.	Rain or snow.	Max. below 32°.	Min. below 32°.	Max. above 90°.	Thunder-storms.	Auroras.	Months and year.
4.9	5.8	3.7	4.8	4,600	28	NW.	NW.	16	11	2	9	8	13	13	20	1	8	16	7	0	10	10	23	0	0	0	J.
5.9	7.2	5.5	6.2	4,407	34	NW.	NW.	7	14	8	11	5	4	10	20	5	5	11	12	0	16	1	12	0	1	0	F.
6.5	6.8	5.2	6.2	5,892	27	NW.	NW.	9	18	4	7	5	4	5	40	0	4	14	12	0	13	0	20	0	0	0	M.
5.2	5.4	4.7	5.1	4,963	24	NW.	NW.	9	7	6	15	16	8	7	21	1	10	13	7	0	13	0	4	0	0	0	A.
4.9	4.1	3.6	4.2	3,783	20	E.	SE.	6	11	16	32	12	4	3	7	2	11	14	6	0	9	0	0	0	5	0	M
5.4	4.9	3.4	4.6	4,122	24	SW.	S.	13	13	7	13	14	12	9	8	1	10	13	7	0	12	0	0	2	7	0	J.
5.3	5.9	3.8	5.0	4,072	29	NW.	S.	6	8	7	21	22	5	10	8	6	11	11	9	0	12	0	0	9	7	0	J.
5.8	5.5	4.0	5.1	3,652	24	NW.	N.	25	11	6	13	24	0	7	6	1	7	16	8	0	7	0	0	2	3	0	A.
5.0	6.4	4.3	5.2	3,184	20	N.	N.	16	15	6	15	12	9	2	10	5	8	15	7	0	10	0	0	0	0	0	S.
5.4	5.4	5.1	5.3	4,093	30	NW.	NW.	16	12	1	6	6	12	10	24	6	9	12	10	0	9	0	0	0	0	0	O.
4.5	4.7	2.7	4.0	3,833	28	NW.	NW.	8	7	6	6	5	11	14	24	9	13	13	4	0	8	0	5	0	0	0	N.
6.1	5.2	5.4	5.6	4,176	33	NW.	NW.	11	10	12	13	3	0	15	26	3	8	12	11	0	10	4	18	0	0	0	D.
5.4	5.6	4.3	5.1	50,777	..	.....	NW.	142	137	81	161	132	82	105	214	40	104	160	100	0	129	15	82	13	23	0	Y.

BISMARCK, DAK.

H=1,681. T=16. h=2.]

3.8	4.8	4.6	4.4	3,814	30	NW.	NW.	18	10	5	2	1	1	4	19	33	12	13	6	0	16	28	31	0	0	1	J.
4.3	4.7	2.9	4.0	4,457	40	NW.	NW.	12	4	8	12	2	3	4	24	15	11	11	6	0	11	25	28	0	0	2	F.
5.2	5.6	4.1	5.0	6,253	44	NW.	N.	25	4	11	14	6	10	6	13	4	9	15	7	0	6	10	30	0	0	0	M.
6.0	6.4	5.9	6.1	6,358	40	NE.	N.	25	12	13	10	8	3	4	11	4	5	13	12	0	14	0	17	0	0	2	A.
4.5	4.4	2.6	3.8	7,201	40	N.	NW.	15	7	8	12	10	9	4	21	7	16	10	5	0	11	0	3	2	6	3	M.
4.6	5.1	4.4	4.7	7,934	39	S.	SE.	13	2	11	23	13	3	5	16	4	8	19	3	0	11	0	0	4	4	0	J.
4.7	4.7	4.2	4.5	4,856	37	N.	E.	14	11	19	8	7	6	3	9	16	8	19	4	0	13	0	0	4	9	0	J.
5.5	6.1	4.1	5.2	5,471	36	NW., W.	E.	6	14	27	13	15	3	6	7	2	8	14	9	0	17	0	0	1	8	0	A.
4.4	5.2	1.4	3.7	5,992	36	NW.	SE.	9	9	15	19	13	2	4	15	4	12	16	2	0	5	0	1	0	2	2	S.
4.5	6.8	4.1	5.1	7,483	48	NW.	NW.	5	9	8	4	6	7	22	29	2	11	13	6	0	11	1	19	0	0	0	O.
3.5	5.1	2.6	3.7	6,652	59	NW.	NW.	3	3	4	8	5	10	20	25	12	14	13	3	0	7	10	28	0	0	1	N.
4.2	6.5	3.7	4.8	5,967	44	NW.	NW.	6	5	7	9	1	2	5	32	26	10	14	7	0	11	21	31	0	0	1	D.
4.6	5.4	3.7	4.6	72,438	..	.....	NW.	151	90	136	134	87	59	87	221	129	124	170	70	0	133	95	188	11	29	12	Y.

BLOCK ISLAND, R. I

[H=27. T=39. h=33.]

6.2	6.5	5.9	6.2	13,829	44	SW.	SW.	13	12	3	8	2	22	13	19	1	6	14	11	0	15	7	24	0	0	0	J.
5.0	5.8	5.8	5.5	13,220	52	NW.	NW.	6	15	3	8	3	17	8	23	1	7	13	8	0	15	3	20	0	2	2	F.
5.7	6.3	5.5	5.8	13,522	48	N., NW	N.	25	10	3	11	4	10	6	24	0	4	19	8	0	10	3	22	0	0	0	M.
5.0	5.1	3.8	4.6	12,232	56	NE.	SW.	7	17	2	6	4	25	11	18	0	11	11	8	0	14	0	6	0	0	0	A.
3.0	4.7	3.3	3.7	7,271	28	SW.	SW.	9	11	1	18	11	33	4	6	0	14	11	6	1	3	0	0	0	0	0	M.
3.3	4.4	3.7	3.8	8,200	30	NE.	SW.	3	13	2	17	9	35	4	7	0	10	16	4	0	11	0	0	0	2	0	J.
4.1	5.5	4.1	4.6	8,501	30	SW.	SW.	2	4	2	11	18	45	10	4	2	9	16	6	0	10	0	0	0	6	0	J.
5.0	5.3	3.4	4.6	7,853	36	N.	SW.	14	13	7	5	8	33	8	3	2	14	12	5	0	8	0	0	0	4	0	A.
4.7	5.2	4.7	4.9	9,193	36	NW., N., SW.	SW.	16	14	1	8	2	33	5	9	2	9	13	8	0	6	0	0	0	0	0	S.
5.3	6.3	6.0	5.9	10,873	48	N.	SW.	11	22	2	2	5	24	10	17	0	8	11	12	0	8	0	0	0	1	0	O.
4.6	3.9	3.9	4.1	14,054	60	NE.	NW.	8	10	2	5	2	18	15	30	0	13	12	5	0	7	1	4	0	0	0	N.
5.4	6.1	6.1	5.9	14,227	72	NE.	NW.	12	14	4	12	3	5	6	37	0	7	14	10	0	13	4	15	0	0	2	D.
4.8	5.4	4.7	5.0	132,975	..	.....	SW.	126	155	32	111	66	300	100	197	8	112	162	91	1	120	18	91	0	15	4	Y.

BOISÉ CITY, IDAHO.

[H=2,750. T=41. h=32.]

6.5	8.2	6.6	7.1	4,268	24	E., W., N.	SE.	9	0	7	34	4	1	12	26	0	3	13	15	0	15	0	24	0	0	0	J.
6.5	8.1	5.0	6.5	3,474	23	SE.	SE.	3	3	8	27	4	3	13	22	1	4	13	11	0	10	3	27	0	0	0	F.
6.3	5.9	4.5	5.6	3,433	24	NW.	SE.	12	3	7	24	4	3	10	21	9	11	7	13	0	6	0	10	0	0	0	M.
6.2	6.8	5.4	6.1	3,694	28	NW.	NW.	12	2	5	15	4	1	4	30	17	4	14	12	0	7	0	6	0	0	0	A.
4.1	4.3	4.8	4.4	3,259	33	NW.	NW.	10	1	6	15	3	1	2	36	19	9	18	4	0	7	0	6	4	1	0	M.
4.0	4.4	4.7	4.4	1,778	24	E.	NW.	4	0	1	5	9	0	8	36	27	10	15	5	0	9	0	0	3	0	0	J.
2.5	1.0	2.5	2.0	1,720	18	SW.	NW.	8	0	1	7	2	3	7	28	37	22	8	1	0	3	0	0	16	0	0	J.
1.7	1.8	2.1	1.9	1,356	28	E.	NW.	4	2	2	2	3	1	3	27	49	20	9	2	0	3	0	0	11	0	0	A.
2.0	2.6	2.3	2.3	739	25	W.	NW.	4	0	3	3	0	2	4	15	59	20	8	2	0	1	0	0	2	0	0	S.
2.3	3.0	1.8	2.4	1,290	27	SW.	NW.	3	2	0	2	0	12	1	13	60	20	9	2	0	2	0	11	0	0	0	O.
4.5	4.4	3.0	4.0	1,516	26	NW.	NW.	9	1	2	12	6	4	6	20	30	12	14	4	0	2	1	21	0	0	0	N.
6.3	6.7	6.0	6.3	2,917	30	SE.	SE.	1	0	1	27	3	1	0	12	48	9	6	16	0	12	4	22	0	0	0	D.
4.4	4.8	4.1	4.4	29,444	..	.....	NW.	79	14	43	173	42	32	70	286	356	144	134	87	0	77	8	127	36	1	0	Y.

Monthly and yearly meteorological summaries—Continued.

BOSTON, MASS.

[Latitude, 42° 21′ N.; longitude, 71° 4′ W.]

Months and year.	Pressure.			Temperature.								Dew point.				Relative humidity.				Precipitation.	
	Mean.	Maximum.	Minimum.	7 a. m.	3 p. m.	10 p. m.	Mean.	Maximum.	Minimum.	Mean. Maximum.	Mean. Minimum.	7 a. m.	3 p. m.	10 p. m.	Mean.	7 a. m.	3 p. m.	10 p. m.	Mean.	Total.	Max. 24 hours.
	In.	In.	In.	°	°	°	°	°	°	°	°	°	°	°	°					In.	In.
J..	29.861	30.52	29.13	22.5	29.9	25.2	25.9	56	-5	34.4	15.7	16	21	17	18	77	71	72	73	4.86	1.04
F..	30.032	30.80	29.08	25.8	32.0	28.8	28.9	48	5	36.5	20.9	18	20	20	19	74	64	71	69	3.69	1.38
M.	29.739	30.68	28.89	27.6	36.4	30.7	31.6	53	10	39.1	23.9	20	21	20	20	73	58	67	66	3.86	1.32
A..	29.820	30.55	29.00	40.8	48.1	42.7	43.9	80	23	52.4	36.1	29	32	30	30	66	56	64	62	2.62	0.81
M.	29.930	30.26	29.44	56.8	63.4	57.6	59.3	89	45	67.6	51.8	46	48	46	46	70	63	70	68	1.67	1.01
J..	29.892	30.22	29.51	62.6	67.6	63.3	64.5	89	48	73.4	57.0	54	54	55	54	75	64	76	72	1.98	0.71
J..	29.841	30.08	29.42	71.3	77.4	71.5	73.4	95	61	82.0	67.1	65	65	65	65	81	68	82	77	3.59	1.30
A..	29.815	30.20	29.51	63.8	72.0	65.5	67.1	86	52	75.0	60.5	57	58	59	58	79	64	79	74	3.05	0.79
S..	29.950	30.34	29.36	55.5	65.1	58.1	59.6	80	40	67.7	51.9	48	52	51	50	78	64	78	73	0.97	0.49
O..	29.872	30.40	29.27	47.0	55.5	50.4	51.0	73	27	58.9	44.2	41	44	45	43	81	68	82	77	2.53	0.96
N..	29.873	30.72	29.12	38.1	46.9	39.7	41.6	69	12	50.8	33.8	31	36	34	34	78	68	80	75	2.22	0.97
D..	29.930	30.82	28.89	29.6	35.5	31.1	32.1	59	5	39.2	25.6	24	27	26	26	81	74	81	79	2.71	0.58
Y..	29.881	30.82	28.89	45.1	52.5	47.0	48.2	95	-5	56.4	40.7	37	40	39	39	76	65	75	72	33.75	.....

BROWNSVILLE, TEX.

[Latitude, 25° 53′ N.; longitude, 97° 26′ W.]

J..	30.065	30.56	29.75	52.2	66.5	56.8	58.5	88	28	68.6	49.0	49	54	53	52	90	65	88	81	0.22	0.11
F..	30.038	30.54	29.62	64.0	71.2	65.0	66.7	81	40	74.9	60.3	61	60	62	61	92	70	90	84	0.68	0.40
M	29.995	30.36	29.70	60.1	75.3	65.3	66.9	85	47	77.5	58.7	58	60	61	60	93	62	88	80	2.87	1.42
A..	29.928	30.22	29.51	67.3	79.1	69.9	72.1	92	51	80.8	65.7	65	64	66	65	92	62	89	81	0.07	0.07
M.	29.891	30.09	29.70	70.7	83.4	74.2	76.1	91	56	86.7	68.8	69	72	71	71	93	68	91	84	3.94	1.67
J..	29.831	29.96	29.69	74.8	84.1	77.6	78.8	91	68	87.0	72.3	73	76	74	74	96	77	91	88	13.80	6.71
J..	29.954	30.09	29.84	76.8	87.4	79.5	81.2	92	65	89.3	75.0	75	76	76	76	93	70	88	84	0.33	0.14
A..	29.868	29.97	29.75	76.6	89.1	79.6	81.8	93	71	90.6	76.0	76	76	76	76	97	66	88	83	1.45	0.94
S..	29.891	30.09	28.93	73.9	83.3	76.6	77.9	90	63	86.3	73.1	73	74	74	73	96	74	91	87	13.65	8.78
O..	29.969	30.31	29.60	65.8	75.3	69.0	70.0	86	50	77.7	64.7	63	66	66	65	92	74	90	85	16.27	6.09
N..	30.044	30.41	29.82	62.5	71.7	64.7	66.3	80	40	73.7	59.8	61	62	62	62	94	73	92	86	1.70	1.40
D..	30.018	30.50	29.57	51.6	61.7	56.3	56.5	79	26	65.5	49.6	49	53	53	52	93	76	88	86	4.89	2.07
Y..	29.958	30.56	28.93	66.4	77.3	69.5	71.1	93	26	79.9	64.4	64	66	66	66	93	70	89	84	59.87	.....

BUFFALO, N. Y.

[Latitude, 42° 53′ N.; longitude, 78° 53′ W.]

J..	29.200	29.80	28.59	20.3	24.3	22.0	22.2	56	-2	31.6	13.9	16	19	18	18	84	81	85	84	1.92	0.40
F..	29.384	30.09	28.51	24.6	28.1	24.7	25.8	54	6	34.3	18.7	21	22	22	22	84	80	88	84	5.51	1.39
M.	29.253	29.95	28.49	25.0	30.3	27.0	27.4	51	11	35.6	21.2	21	23	23	22	84	76	85	82	2.12	0.55
A..	29.242	29.84	28.43	37.3	44.1	37.5	39.6	65	19	49.0	32.8	29	33	31	31	73	68	78	73	1.47	0.56
M.	29.294	29.62	28.92	56.9	67.8	60.1	61.6	84	37	72.0	52.3	48	48	49	48	73	54	70	66	3.08	0.99
J..	29.277	29.68	28.94	63.0	71.0	65.4	66.5	86	52	73.9	58.4	57	56	60	58	82	62	82	76	2.05	0.39
J..	29.247	29.46	28.91	71.3	79.5	74.0	74.9	92	60	82.3	67.6	63	65	65	64	76	62	74	71	1.98	1.10
A..	29.275	29.58	29.02	63.1	73.9	67.3	68.1	94	50	76.2	59.7	55	54	57	55	75	52	70	66	3.56	1.30
S..	29.374	29.71	28.84	54.9	63.9	58.0	58.9	79	36	66.8	51.2	48	48	49	48	77	59	73	70	2.30	0.56
O..	29.273	29.72	28.70	45.1	50.2	46.4	47.2	69	24	54.4	41.1	37	38	39	38	75	64	76	72	2.76	0.53
N..	29.281	30.17	28.64	36.2	39.8	37.9	38.0	64	15	45.1	31.9	28	28	29	28	73	65	72	70	2.53	0.49
D..	29.316	30.20	28.73	28.5	32.5	31.3	30.8	53	6	36.1	25.7	23	25	25	24	81	74	78	78	2.27	0.50
Y..	29.284	30.20	28.43	43.8	50.4	46.0	46.7	94	-2	54.8	39.5	37	38	39	38	78	66	78	74	31.55	.....

CAIRO, ILL.

[Latitude, 37° 0′ N.; longitude 89° 10′ W.]

J..	29.702	30.28	28.98	28.6	38.4	33.1	33.4	66	-1	41.3	24.9	22	22	24	23	78	57	72	69	2.15	1.65
F..	29.792	30.25	28.98	39.3	45.3	44.6	43.1	72	12	50.4	35.3	35	34	35	35	85	68	73	75	4.60	1.34
M.	29.689	29.97	29.32	41.9	53.1	48.8	47.9	75	24	55.5	40.4	33	33	34	33	74	51	59	61	2.18	0.58
A..	29.648	30.02	29.07	52.1	66.9	61.4	60.1	87	33	69.2	50.2	42	43	45	44	71	45	58	58	2.09	1.50
M.	29.605	29.88	29.33	64.6	75.9	69.8	70.1	87	53	78.8	62.5	61	58	62	60	88	56	77	74	1.37	0.34
J..	29.631	29.83	29.39	69.1	81.6	74.5	75.1	96	54	82.7	66.5	64	62	66	64	84	54	74	71	2.34	1.56
J..	29.620	29.77	29.46	73.9	87.8	79.9	80.5	98	66	89.2	71.9	70	68	71	69	87	53	75	72	1.42	1.12
A..	29.614	29.80	29.47	70.3	86.3	77.3	78.0	97	58	88.2	68.2	6[illegible]	62	65	63	78	45	68	64	1.10	0.48
S..	29.683	29.91	29.28	64.1	78.7	70.5	71.1	95	44	80.4	62.8	57	58	61	58	80	51	73	68	1.67	0.95
O..	29.737	30.04	29.45	48.1	65.0	55.2	56.1	82	28	67.1	46.1	41	40	44	42	78	42	67	62	0.38	0.15
N..	29.755	30.28	29.32	39.9	53.6	46.3	46.6	75	10	57.4	35.6	30	31	32	31	70	46	59	59	3.33	1.13
D..	29.729	30.32	29.18	32.5	39.1	37.3	36.3	58	5	44.7	29.1	26	27	26	26	78	65	69	71	4.12	1.81
Y..	29.684	30.32	28.98	52.0	64.3	58.2	58.2	98	-1	67.1	49.5	45	45	47	46	79	53	69	67	26.75	.....

Monthly and yearly meteorological summaries—Continued.

BOSTON, MASS.

[H=124. T=116. h=174.]

Cloudiness (in tenths).				Wind.													Number of days—										
7 a. m.	3 p. m.	10 p. m.	Mean.	Total (miles).	Maximum.	Direction.	Prevailing direction.	North.	Northeast.	East.	Southeast.	South.	Southwest.	West.	Northwest.	Calms.	Clear.	Fair.	Cloudy.	Foggy.	Rain or snow.	Max. below 32°.	Min. below 32°.	Max. above 90°.	Thunder-storms.	Auroras.	Months and year.
5.5	6.5	6.1	6.0	9,865	48	E.	W.	21	4	3	3	10	11	23	18	0	7	11	13	0	12	11	27	0	1	0	J.
5.8	6.1	5.9	5.9	9,456	52	NW.	W.	14	3	7	5	3	14	23	15	0	6	11	11	0	14	7	26	0	1	2	F.
6.5	6.5	5.3	6.1	10,755	44	NE.	NW.	13	3	7	5	5	4	23	33	0	8	10	13	0	11	4	27	0	0	0	M.
5.7	4.7	4.2	4.9	9,315	40	N.	W.	11	9	12	7	7	5	22	17	0	9	14	7	0	12	0	10	0	0	0	A.
4.6	4.1	3.5	4.1	7,458	30	NW.	E.	5	10	25	6	9	15	10	12	1	16	8	7	1	7	0	0	0	0	1	M.
5.0	5.8	4.0	5.1	7,198	32	NE.	E.	7	10	18	10	13	14	12	6	0	9	13	8	0	5	0	0	0	1	0	J.
6.5	6.0	3.7	5.4	7,051	29	N.	S.	4	4	10	7	24	22	19	3	0	7	14	10	0	11	0	0	3	4	0	J.
4.5	4.8	3.1	4.1	6,436	40	S.	SW.	14	8	6	12	7	17	15	14	0	12	13	6	0	8	0	0	0	1	1	A.
3.0	5.1	2.9	3.7	7,319	30	SW.	W.	11	5	7	4	0	19	26	16	2	14	11	5	1	7	0	0	0	1	0	S.
4.8	6.7	5.0	5.5	7,474	40	SW.	W.	10	2	7	10	7	16	24	16	1	4	17	10	0	7	0	1	0	0	0	O.
5.7	4.5	2.4	4.2	8,492	42	NW., N	W.	13	1	4	3	9	18	28	14	0	11	12	7	0	8	1	10	0	0	0	N.
6.8	6.3	4.7	5.9	8,313	56	NE.	W.	18	4	3	11	7	0	32	18	0	6	16	9	0	11	7	20	0	0	0	D.
5.4	5.6	4.8	5.1	99,132	..	.....	W.	141	63	109	83	101	155	257	182	4	109	150	106	2	113	30	121	3	9	4	Y.

BROWNSVILLE, TEX.

[H=57. T=17. h=34.]

3.3	4.2	2.5	3.3	7,293	32	N.	N.	35	5	6	7	28	8	1	2	1	14	14	3	0	2	0	2	0	0	0	J.
5.9	6.0	3.4	5.1	7,652	32	SE., N.	S.	22	7	3	8	38	3	0	1	2	7	14	7	0	5	0	0	0	0	0	F.
3.1	3.5	2.5	3.0	6,665	36	S.	S.	14	10	10	12	38	1	2	3	3	19	7	5	0	6	0	0	0	1	0	M.
4.4	5.5	1.3	3.7	7,361	30	S.	SE.	10	2	8	3	34	1	0	0	0	10	18	2	0	1	0	0	2	0	0	A.
5.1	4.7	2.4	4.1	6,695	32	N.	S., SE.	5	4	15	30	30	5	1	3	0	10	17	4	0	7	0	0	4	4	0	M.
4.6	7.0	3.4	5.0	4,598	26	W.	SE.	14	10	15	31	11	1	3	2	3	5	18	7	0	12	0	0	2	6	0	J.
1.5	4.7	.4	2.2	5,370	40	NE.	S.	1	3	4	36	43	3	1	1	1	22	9	0	0	7	0	0	5	1	0	J.
2.2	4.1	1.2	2.5	4,831	24	E.	SE.	1	0	18	43	27	2	0	2	0	22	9	0	0	6	0	0	22	3	0	A.
3.6	5.8	2.2	3.9	5,067	78	NW.	E.	16	14	18	16	16	1	1	4	4	12	15	3	0	15	0	0	1	1	0	S.
4.6	5.9	4.4	5.0	6,438	32	NE.	N.	39	10	12	9	15	0	0	6	2	10	11	10	0	16	0	0	0	0	0	O.
5.9	6.0	2.9	4.9	4,646	27	S.	S.	16	20	9	8	22	1	2	10	2	8	14	8	0	4	0	0	0	0	0	N.
5.3	6.3	5.6	5.7	6,042	26	NW., S., N.	N.	29	5	3	14	13	8	2	19	0	9	9	13	0	10	0	4	0	0	0	D.
4.1	5.3	2.7	4.0	72,658	..	.....	S.	202	90	121	249	315	34	13	53	18	148	155	62	0	91	0	6	36	16	0	Y.

BUFFALO, N. Y.

[H=690. T=103. h=93.]

9.1	8.6	7.1	8.3	12,368	58	SW.	W.	3	8	5	4	23	21	24	5	0	1	7	23	0	23	19	30	0	0	0	J.
7.1	7.7	8.0	7.6	10,247	63	SW.	SW.	2	17	8	6	4	24	23	0	0	2	9	17	0	19	11	26	0	0	1	F.
7.0	7.1	5.7	6.6	8,208	36	SW.	W.	8	7	7	3	7	18	26	17	0	7	8	16	0	16	10	29	0	0	0	M.
5.0	5.8	3.7	4.8	7,834	44	W.	SW.	1	17	7	2	9	36	9	6	3	10	13	7	0	10	0	10	0	1	0	A.
4.0	5.1	2.9	4.0	5,230	26	S.	SW.	7	19	7	6	15	30	7	2	0	12	14	5	0	10	0	0	0	5	0	M.
5.2	6.2	3.2	4.9	5,134	28	SW.	SW.	10	18	5	1	10	34	9	2	1	10	12	8	0	10	0	0	0	3	0	J.
4.3	4.4	1.9	3.5	6,015	30	W.	SW.	13	16	5	3	11	34	7	4	0	13	15	3	0	7	0	0	1	4	0	J.
2.8	4.1	3.0	3.6	5,300	30	S.	SW.	14	12	7	1	12	20	12	12	3	19	6	6	0	12	0	0	1	3	0	A.
5.6	5.4	3.1	4.7	5,694	36	W.	SW.	11	14	6	6	14	20	8	10	1	11	9	10	0	12	0	0	0	2	0	S.
5.7	6.4	4.9	5.7	8,685	66	W.	SW.	6	2	2	1	16	28	27	5	6	8	14	9	0	13	0	5	0	3	0	O.
6.3	6.2	6.2	6.3	10,039	45	SW.	SW.	4	7	5	3	19	21	18	12	1	7	8	15	0	15	2	13	0	0	0	N.
8.0	7.3	7.4	7.6	9,039	54	W.	W.	5	10	12	6	16	17	24	2	1	3	8	20	0	19	8	24	0	0	0	D.
5.9	6.2	4.8	5.6	93,793	..	.....	SW.	84	147	76	42	156	303	194	77	16	103	123	139	0	166	50	137	2	21	1	Y.

CAIRO, ILL.

[H=359. T=87. h=78.]

5.2	6.4	5.1	5.6	7,976	44	SW.	S.	15	4	3	6	29	12	8	15	1	6	15	10	0	11	11	21	0	1	0	J.
6.6	7.0	5.3	6.3	7,291	40	W.	N.	18	7	8	10	17	5	8	10	1	4	14	10	0	16	2	8	0	5	0	F.
5.6	6.4	3.7	5.2	7,045	44	W.	N.	26	10	11	6	7	9	9	15	0	11	10	10	0	10	0	5	0	2	0	M.
5.1	5.4	2.4	4.3	6,430	35	S.	S.	1	6	3	8	33	7	11	20	1	10	15	5	0	7	0	0	0	3	0	A.
5.5	6.6	4.3	5.5	4,162	41	S.	N., S.	15	8	11	6	15	10	5	10	13	5	18	8	0	15	0	0	0	12	0	M.
4.8	6.0	3.8	4.9	4,180	24	W.	S.	5	4	17	12	20	12	11	7	2	9	13	8	0	9	0	0	3	5	0	J.
3.3	4.6	2.3	3.7	3,906	27	W.	SW.	13	5	9	5	14	28	10	6	3	15	13	3	0	8	0	0	15	10	0	J.
4.0	4.5	3.2	3.9	4,552	37	NW.	N.	23	10	12	4	16	12	6	7	3	12	14	5	0	8	0	0	17	4	0	A.
6.8	5.5	5.4	1.5	3,861	33	N.	S.	15	12	15	6	20	13	3	3	3	8	10	12	0	10	0	0	7	3	0	S.
3.9	3.1	3.5	3.5	6,347	40	N.	N., S.	24	9	8	4	24	5	5	13	1	16	7	8	0	4	0	2	0	0	0	O.
4.5	3.5	3.4	3.8	5,423	36	N.	N.	22	6	12	0	20	10	8	10	2	15	6	9	0	7	2	7	0	3	0	N.
6.1	7.3	6.3	6.6	6,293	48	W.	S.	13	9	10	6	19	5	14	17	0	6	11	14	0	13	4	19	0	1	0	D.
5.1	5.5	4.0	4.9	68,466	..	.....	S.	190	90	119	73	234	128	98	133	30	117	146	102	0	118	19	62	42	49	0	Y.

Monthly and yearly meteorological summaries—Continued.

CARSON CITY, NEV.

[Latitude, 39° 8′ N.; longitude, 119° 47′ W.]

Months and year.	Pressure.			Temperature.								Dew point.				Relative humidity.				Precipitation.	
	Mean.	Maximum.	Minimum.	7 a. m.	3 p. m.	10 p. m.	Mean.	Maximum.	Minimum.	Mean. Maximum.	Mean. Minimum.	7 a. m.	3 p. m.	10 p. m.	Mean.	7 a. m.	3 p. m.	10 p. m.	Mean.	Total.	Max. 24 hours.
	In.	In.	In.	°	°	°	°	°	°	°	°	°	°	°	°					In.	In.
J	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
F	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
M	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
A	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
M	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
J	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
J	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
A	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
S	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
O	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
N	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
D	.....	.....	.....	25.5	39.3	35.6	33.5	57	−2	45.0	20.7	16	20	18	18	68	48	52	56	2.08	1.29
Y	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

CEDAR KEYS, FLA.

[Latitude, 29° 8′ N.; longitude, 83° 2′ W.]

J	30.196	30.52	29.83	45.8	55.1	50.0	50.3	70	24	58.1	42.2	42	49	46	46	88	80	87	85	1.31	0.39
F	30.235	30.52	29.92	62.5	69.8	65.2	65.8	77	39	72.8	60.3	60	63	62	62	93	79	89	87	0.19	0.13
M	30.063	30.45	29.74	56.8	65.3	61.6	61.2	76	40	68.3	54.4	49	53	54	52	77	67	76	73	1.87	1.56
A	30.059	30.28	29.74	63.7	72.4	65.7	67.3	82	42	75.9	60.1	59	59	60	60	86	66	83	78	6.63	3.79
M	29.994	30.25	29.79	71.8	79.1	73.8	74.9	87	57	81.4	67.5	66	65	67	66	82	64	80	76	4.43	3.04
J	29.979	30.13	29.79	76.1	82.6	77.3	78.7	89	64	85.0	71.6	71	70	71	71	86	67	80	78	8.65	2.45
J	30.012	30.13	29.90	81.3	85.4	81.1	82.6	92	69	87.5	76.2	74	74	74	74	80	70	80	77	9.40	3.15
A	29.929	30.08	29.63	79.7	86.4	81.4	82.5	92	70	88.3	75.7	73	72	74	73	82	64	77	74	5.45	1.83
S	30.004	30.11	29.83	73.2	82.8	76.9	77.6	91	62	84.6	71.0	69	69	69	69	87	65	77	76	1.11	0.40
O	29.970	30.16	29.77	67.9	77.3	71.2	72.1	86	39	79.8	65.4	63	65	64	64	85	68	78	77	0.43	0.18
N	30.078	30.34	29.82	57.3	67.7	62.2	62.4	77	27	70.3	54.3	52	55	54	54	83	66	77	75	1.08	0.65
D	30.076	30.46	29.61	53.9	61.3	57.3	57.5	73	34	64.1	51.1	51	53	52	52	88	76	84	83	3.64	0.97
Y	30.050	30.52	29.61	65.8	73.9	68.6	69.4	92	24	76.3	62.5	61	62	62	62	85	69	81	78	44.19	.....

CHARLESTON, S. C.

[Latitude, 32° 47′ N.; longitude, 79° 56′ W.]

J	30.121	30.50	29.67	41.7	50.9	44.1	45.6	70	17	53.4	37.9	38	40	32	39	87	70	79	78	4.30	1.17
F	30.204	30.60	29.73	53.4	61.2	55.4	56.7	80	34	65.9	50.1	50	53	51	51	88	78	86	84	2.29	0.72
M	29.981	30.44	29.61	49.1	61.2	54.2	54.8	80	34	65.0	46.6	41	45	45	44	74	58	74	68	0.50	0.15
A	30.029	30.43	29.56	58.0	68.0	61.7	62.6	85	33	71.7	55.5	53	51	54	52	84	59	78	74	3.53	1.90
M	29.981	30.29	29.70	69.7	76.9	71.5	72.7	89	55	80.4	66.4	64	63	65	64	81	64	80	75	4.26	2.30
J	29.974	30.23	29.71	74.7	81.5	76.2	77.5	100	57	85.4	71.3	68	70	70	70	82	69	81	78	4.54	1.10
J	29.989	30.16	29.86	79.5	85.3	80.2	81.7	98	70	88.7	76.1	74	75	75	75	84	73	85	81	7.74	2.40
A	29.933	30.12	29.56	77.3	81.2	79.1	80.2	98	67	86.7	74.2	72	72	73	72	85	67	82	78	4.12	1.77
S	30.059	30.22	29.72	70.1	78.4	73.4	74.0	90	49	80.5	67.6	65	66	67	66	85	66	80	77	1.31	0.48
O	30.000	30.25	29.66	61.9	71.4	64.8	66.0	88	43	73.2	58.7	56	57	58	57	82	64	81	75	3.55	1.20
N	30.086	30.49	29.61	50.8	62.9	55.0	56.2	77	28	64.6	47.8	46	48	49	48	85	60	81	75	0.64	0.27
D	30.083	30.53	29.48	47.4	55.0	50.7	51.0	73	29	57.3	44.3	43	45	46	45	86	72	84	80	7.91	3.08
Y	30.036	30.60	29.48	61.1	69.7	63.9	64.9	100	17	72.7	58.0	56	57	58	57	84	67	81	77	44.69	.....

CHARLOTTE, N. C.

[Latitude, 35° 13′ N.; longitude, 80° 51′ W.]

J	29.261	29.71	28.86	32.7	44.4	37.6	38.2	69	8	47.2	29.4	27	28	27	27	79	55	68	67	2.39	0.62
F	29.383	29.90	28.79	43.5	53.6	48.5	48.5	71	26	58.1	40.8	40	43	42	41	87	70	79	79	4.81	1.63
M	29.157	29.70	28.76	40.0	56.0	47.1	47.7	80	27	59.7	37.4	33	36	34	34	76	52	63	64	2.93	0.89
A	29.199	29.68	28.58	50.9	68.8	58.4	59.4	89	32	71.4	48.0	44	49	48	47	77	52	69	66	1.84	0.42
M	29.181	29.52	28.88	64.6	79.0	68.2	70.6	91	50	81.2	61.4	59	61	61	60	84	57	79	73	3.64	0.82
J	29.192	29.48	28.95	69.5	83.6	72.6	75.2	102	53	86.4	64.5	62	62	63	62	77	50	74	67	4.44	1.80
J	29.185	29.41	28.99	74.9	87.1	76.9	79.6	102	66	91.0	70.8	72	75	73	73	90	69	87	82	7.46	1.81
A	29.163	29.41	28.87	70.1	81.6	72.3	74.7	95	53	85.8	66.2	66	68	68	68	89	66	86	80	9.02	3.04
S	29.277	29.52	28.96	63.6	78.6	68.0	70.1	94	40	81.0	59.6	59	59	58	59	86	53	72	70	1.24	0.79
O	29.221	29.55	28.85	52.2	65.0	56.9	58.0	81	36	67.3	48.7	46	47	47	47	82	58	73	71	8.04	2.49
N	29.285	29.76	28.68	42.1	58.9	49.3	50.1	74	22	61.4	39.8	35	39	38	38	78	50	67	65	0.51	0.33
D	29.282	29.84	28.72	37.3	47.8	41.2	42.1	63	16	50.0	34.1	32	34	32	33	84	61	73	73	4.94	1.26
Y	29.232	29.90	28.58	53.4	67.0	58.1	59.5	102	8	70.0	50.1	48	50	49	49	82	58	74	71	51.26	.....

Monthly and yearly meteorological summaries—Continued.

CARSON CITY, NEV.

[*H*=... *T*=21. *h*=42.]

Cloudiness (in tenths).				Wind.													Number of days—										
7 a. m.	3 p. m.	10 p. m.	Mean.	Total (miles).	Maximum.	Direction.	Prevailing direction.	North.	Northeast.	East.	Southeast.	South.	Southwest.	West.	Northwest.	Calms.	Clear.	Fair.	Cloudy.	Foggy.	Rain or snow.	Max. below 32°.	Min. below 32°.	Max. above 90°.	Thunder-storms.	Auroras.	Months and year.
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	J.
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	F.
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	M.
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	A.
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	M.
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	J.
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	J.
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	A.
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	S.
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	O.
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	N.
3.2	3.8	2.7	3.2	...	...	...	...	...	...	...	...	...	...	...	...	...	16	12	3	0	6	1	25	0	0	0	D.
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	Y.

CEDAR KEYS, FLA.

[*H*=22. *T*=45. *h*.=35.]

4.2	3.7	2.5	3.5	6,898	39	NW.	W.	14	14	8	6	13	7	20	11	0	14	13	4	0	10	0	5	0	0	0	J.
4.5	3.7	2.1	3.4	6,453	32	NW.	S.	2	15	10	4	22	13	10	8	0	13	13	2	0	4	0	0	0	1	0	F.
3.4	3.7	3.3	3.5	6,755	41	NW.	W.	8	13	4	3	9	13	32	11	0	15	11	5	0	5	0	0	0	1	0	M.
3.3	4.3	3.2	3.6	7,545	28	NE., SE., S.	W.	6	22	8	7	4	13	23	5	2	16	9	5	0	6	0	0	0	1	0	A.
5.5	6.0	4.5	5.3	6,290	26	S	W.	7	12	9	9	10	13	20	8	5	7	17	7	0	7	0	0	0	8	0	M.
5.7	6.6	5.7	6.0	3,862	28	SW.	NE.	2	23	16	4	12	13	11	5	4	4	15	11	0	11	0	0	0	9	0	J.
5.9	7.0	6.5	6.5	5,660	54	S.	SW.	0	5	7	5	12	34	12	0	3	1	13	10	0	14	0	0	6	8	0	J.
3.2	4.4	3.4	3.7	6,437	35	SW.	W.	10	18	7	6	4	16	28	4	0	14	14	3	0	9	0	0	4	10	0	A.
3.3	5.0	3.6	4.0	7,162	30	SE.	NE.	8	39	10	5	7	1	15	5	0	14	11	4	0	9	0	0	1	7	0	S.
5.1	5.6	4.4	5.0	7,409	34	S.	NE.	7	34	12	5	6	1	11	15	2	13	8	10	0	9	0	0	0	2	0	O.
3.0	2.1	1.7	2.6	5,816	27	NE.	NE.	11	31	10	2	9	4	14	9	0	19	10	1	0	5	0	1	0	1	0	N.
5.9	6.5	5.2	5.9	7,693	33	NE.	NE.	5	24	10	11	13	1	15	14	0	6	17	8	0	12	0	0	0	0	0	D.
4.4	5.0	3.8	4.4	79,980	...	.....	NE.	80	250	111	67	121	129	211	95	16	136	151	70	0	101	0	6	11	48	0	Y.

CHARLESTON, S. C.

[*H*=52. *T*=62. *h*=55.]

5.0	5.1	3.7	4.6	6,059	29	SW.	N.	24	3	2	6	5	21	8	14	10	9	16	6	0	13	1	8	0	2	0	J.
6.5	7.5	4.6	6.2	5,783	38	E.	SW.	10	15	10	7	2	19	10	6	5	7	9	12	0	12	0	0	0	3	0	F.
3.5	4.4	2.6	3.5	6,658	28	E.	SW.	9	5	8	5	1	30	19	14	2	15	12	4	0	6	0	0	0	2	0	M.
2.3	3.9	3.0	3.1	6,783	30	NE.	SW.	8	5	13	8	3	29	12	6	6	18	7	5	0	5	0	0	0	3	0	A.
6.0	4.2	4.4	4.9	6,099	35	NE.	SW.	7	6	10	13	20	22	5	5	5	7	20	3	0	15	0	0	0	12	0	M.
4.9	4.2	3.7	4.3	6,799	24	E.	SW.	4	16	11	7	10	31	7	1	3	13	10	7	0	13	0	0	7	8	0	J.
6.0	5.9	3.1	5.0	6,223	33	S.	SW.	1	5	4	1	20	44	8	4	6	7	19	5	0	11	0	0	12	13	0	J.
4.8	4.1	2.7	3.9	7,177	30	E.	SW.	6	21	15	6	8	26	4	5	2	16	10	5	0	13	0	0	6	0	0	A.
3.3	2.5	1.8	2.5	6,661	30	E.	NE., E.	6	18	18	14	11	14	1	4	4	21	7	2	0	9	0	0	1	8	0	S.
4.6	3.6	4.0	4.1	5,882	25	NE., E., SE.	N.	20	18	11	6	4	11	8	12	3	13	10	8	0	12	0	0	0	0	0	O.
3.1	2.8	2.0	2.6	5,142	25	NE.	NE.	12	32	7	2	2	8	14	10	3	20	7	3	0	9	0	1	0	1	0	N.
6.5	7.3	5.1	6.3	5,761	26	W.	NE.	13	19	11	9	1	6	15	15	4	8	10	13	0	10	0	2	0	0	0	D.
4.7	4.6	3.4	4.2	75,047	...	.....	SW.	120	163	120	84	87	261	111	96	53	154	137	73	0	128	1	11	26	47	0	Y

CHARLOTTE, N. C.

[*H*.=808. *T*.=57. *h*=47.]

5.3	5.2	2.4	4.3	3,480	24	NW.	SW.	8	6	5	1	18	26	2	11	16	9	17	5	0	12	5	17	0	0	0	J.
6.6	7.7	6.4	6.9	4,369	28	W.	SW.	6	18	13	5	10	20	9	2	1	3	12	13	0	16	0	4	0	1	0	F.
4.4	6.0	2.9	4.4	4,929	21	SW.	SW.	17	10	8	1	6	18	12	17	4	12	11	8	0	9	0	7	0	1	0	M.
3.8	4.3	2.4	3.5	4,284	35	SW.	SW.	8	12	12	6	13	18	7	12	2	15	11	4	0	9	0	0	0	5	0	A.
5.6	6.0	4.6	5.4	2,935	18	SE.	E.	2	10	22	8	14	15	2	9	11	6	17	8	0	16	0	0	1	9	0	M.
4.6	5.9	4.1	4.9	3,068	24	W.	E.	11	12	17	2	6	9	4	9	20	9	15	6	0	10	0	0	6	9	0	J.
5.6	7.6	6.1	6.4	2,482	26	E.	SW.	11	2	6	15	7	21	5	4	22	3	15	13	0	15	0	0	16	15	0	J.
5.8	7.1	4.5	5.8	2,413	32	NW.	NE.	15	24	13	6	11	12	4	4	4	8	11	12	0	16	0	0	10	9	0	A.
5.3	6.1	3.1	4.8	3,408	20	NE.	SW.	4	20	15	8	7	23	6	2	5	8	17	5	0	5	0	0	3	1	0	S.
4.4	5.5	4.3	4.7	4,108	22	NW.	NE.	21	24	3	2	7	14	5	10	7	15	5	11	0	13	0	0	0	0	0	O.
4.0	4.2	2.4	3.5	3,328	18	NE.	SW.	12	11	6	2	15	31	4	8	1	16	10	4	0	3	0	5	0	0	0	N.
7.9	6.7	5.8	6.5	3,972	28	W.	NE.	11	21	16	3	10	10	7	11	4	5	14	12	0	13	0	10	0	0	0	D.
5.2	6.0	4.1	5.1	43,786	...	.....	SW.	126	170	136	59	124	217	67	99	97	109	155	101	0	137	5	43	36	50	0	Y.

Monthly and yearly meteorological summaries—Continued.

CHATTANOOGA, TENN.

[Latitude, 35° 4′ N.; longitude, 85° 15′ W.]

Months and year.	Pressure.			Temperature.								Dew point.				Relative humidity.				Precipitation.	
	Mean.	Maximum.	Minimum.	7 a. m.	3 p. m.	10 p. m.	Mean.	Maximum.	Minimum.	Mean. Maximum.	Mean. Minimum.	7 a. m.	3 p. m.	10 p. m.	Mean.	7 a. m.	3 p. m.	10 p. m.	Mean.	Total.	Max. 24 hours.
	In.	In.	In.	°	°	°	°	°	°	°	°	°	°	°	°					In.	In.
J	29.322	29.72	28.80	32.9	45.1	40.2	39.4	70	7	49.9	29.9	26	29	30	28	76	56	69	67	5.60	3.54
F	29.402	29.79	28.79	46.4	56.3	50.8	51.2	74	27	59.9	43.8	41	44	44	43	83	66	78	76	7.16	1.58
M	29.246	29.49	29.00	43.6	57.7	51.2	50.8	76	25	61.6	41.7	36	37	37	37	74	51	62	62	4.52	2.20
A	29.253	29.67	28.72	52.3	70.7	61.5	61.5	89	34	73.8	49.4	41	39	40	40	67	34	48	50	3.06	2.36
M	29.206	29.46	28.94	63.7	79.5	69.0	70.7	90	53	82.4	60.6	58	55	59	57	83	46	72	67	6.57	1.80
J	29.229	29.46	28.92	67.1	83.1	72.5	74.2	98	52	86.0	64.0	60	61	63	62	80	50	73	67	2.18	0.76
J	29.224	29.41	29.08	73.4	84.0	76.9	78.1	99	64	87.6	70.9	70	69	71	70	87	63	83	78	5.30	1.28
A	29.197	29.42	28.98	70.3	84.3	74.4	76.3	96	58	87.4	67.8	66	64	68	66	86	53	80	73	3.13	1.72
S	29.289	29.50	28.94	62.8	80.8	69.5	71.0	95	41	83.2	60.6	57	54	60	57	83	42	71	65	3.60	2.96
O	29.302	29.49	29.06	50.7	65.9	56.8	57.8	84	32	68.6	48.7	47	45	47	46	86	52	72	70	3.41	1.36
N	29.338	29.75	28.80	41.5	59.3	49.6	50.1	76	16	61.5	39.5	35	36	36	36	79	45	62	62	1.08	0.73
D	29.323	29.78	28.76	36.3	44.0	39.9	40.1	60	13	47.7	33.6	31	35	35	34	83	72	83	79	5.46	1.21
Y	29.277	29.79	28.73	53.4	67.6	59.4	60.1	99	7	70.8	50.8	47	47	49	48	80	53	71	68	51.07	.....

CHEYENNE, WYO.

[Latitude, 41° 8′ N.; longitude, 104° 48′ W.]

J	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
F	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
M	24.012	24.22	23.75	33.8	51.8	40.6	42.1	68	12	55.0	30.0	20	23	24	22	58	37	54	50	0.14	0.06
A	23.902	24.18	23.56	34.9	51.0	42.9	42.9	76	16	55.0	32.0	22	18	24	21	63	35	52	50	2.20	0.80
M	24.004	24.30	23.60	42.6	64.3	53.9	53.6	84	24	69.0	40.0	31	28	35	31	66	31	51	49	0.94	0.24
J	24.019	24.32	23.83	53.3	74.6	64.9	64.2	90	34	79.0	50.0	42	38	40	40	66	29	44	46	0 80	0.29
J	24.138	24.28	23.99	54.5	75.6	65.4	65.2	90	46	81.0	52.0	46	41	47	45	76	34	54	55	2.71	0.84
A	24.074	24.30	23.85	52.5	73.8	62.3	62.9	92	45	78.0	51.0	45	42	47	45	78	39	63	60	1.90	0.36
S	24.114	24.34	23.83	49.1	69.3	57.5	58.6	86	33	73.0	46.0	35	30	35	34	63	28	46	46	1.25	0.78
O	24.076	24.43	23.57	35.1	53.6	40.7	43.1	82	4	57.0	30.0	20	18	22	20	59	33	55	49	0.49	0.25
N	24.013	24.23	23.64	31.0	47.9	35.0	38.0	70	-12	51.0	24.0	7	3	7	6	46	29	41	39	0.29	0.16
D	23.888	24.27	23.29	21.7	33.6	24.6	26.6	56	-13	38.0	14.0	8	6	9	8	64	41	60	55	0.35	0.11
Y	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

CHICAGO, ILL.

[Latitude, 41° 52′ N.; longitude, 87° 38′ W.]

J	29.171	29.72	28.54	14.7	20.2	17.1	17.3	52	-15	26.6	6.1	9	15	12	12	79	79	79	79	3.13	1.39
F	29.338	29.99	28.29	25.0	29.2	27.2	27.1	58	- 7	35.1	16.9	21	24	22	22	86	81	82	83	5.10	1.23
M	29.293	29.82	28.67	28.8	34.0	32.8	31.9	68	9	39.4	25.0	23	25	26	24	79	70	75	75	0.89	.48
A	29.175	29.63	28.51	41.6	52.0	48.7	47.4	82	19	60.2	37.2	33	34	35	34	72	54	62	62	0.46	0.18
M	29.217	29.51	28.84	56.5	63.5	58.2	59.4	86	42	68.8	51.1	48	48	48	48	74	60	70	68	1.38	0.49
J	29.221	29.57	28.92	63.5	71.3	67.0	67.3	96	48	75.9	58.8	56	56	56	56	78	62	71	70	1.62	0.70
J	29.211	29.40	28.96	71.8	80.4	75.7	76.0	100	61	84.2	66.4	62	65	63	63	73	62	67	67	1.06	0.45
A	29.242	29.46	28.98	65.6	73.3	70.1	69.7	98	49	76.5	60.8	57	58	58	57	75	61	67	68	3.35	1.24
S	29.309	29.67	28.96	58.8	66.3	62.5	62.5	92	38	70.1	54.5	52	52	53	52	79	63	73	72	4.03	1.33
O	29.281	29.78	28.74	41.6	53.0	47.2	47.3	83	14	56.6	37.7	36	39	36	37	82	61	69	70	2.03	0.82
N	29.277	29.96	28.50	34.8	41.2	38.1	38.0	67	- 1	45.9	26.4	27	30	28	28	76	67	69	71	2.41	0.66
D	29.271	29.88	28.66	26.3	30.0	28.0	28.1	53	- 5	34 2	19.2	20	23	22	22	77	77	81	78	3.67	1.04
Y	29.251	29.99	28.29	44.1	51.2	47.7	47.7	100	-15	56.1	38.3	37	39	38	38	77	66	72	72	29.13	.....

Monthly and yearly meteorological summaries—Continued.

CHATTANOOGA, TENN.

[H=183. T=71. h=60.]

Cloudiness (in tenths).				Wind.													Number of days—										
7 a. m.	3 p. m.	10 p. m.	Mean.	Total (miles).	Maximum.	Direction.	Prevailing direction.	North.	Northeast.	East.	Southeast.	South.	Southwest.	West.	Northwest.	Calms.	Clear.	Fair.	Cloudy.	Foggy.	Rain or snow.	Max. below 32°.	Min. below 32°.	Max. above 90°.	Thunder-storms.	Auroras.	Months and year.
5.0	4.5	3.8	4.4	5,981	33	W.	SW.	5	11	3	0	25	30	6	12	1	9	14	8	0	10	3	15	0	1	0	J.
6.7	7.6	6.7	7.0	5,398	44	NW.	S.	4	15	5	6	26	11	7	10	0	5	7	16	0	22	0	3	0	3	0	F.
5.2	5.2	3.3	4.6	5,705	28	SW., NW.	NW.	6	12	5	7	11	19	11	22	0	14	9	8	0	8	0	5	0	1	0	M.
4.1	4.2	2.7	3.7	4,932	32	SW.	SW., W.	12	6	6	7	13	16	16	12	2	12	15	3	0	6	0	0	0	4	0	A.
5.2	6.5	4.7	5.5	3,237	33	S.	NE.	9	22	2	13	10	20	8	9	0	4	20	7	0	15	0	0	0	12	0	M.
3.1	5.4	4.2	4.2	3,153	30	SW.	NE.	3	17	5	12	12	16	15	8	2	8	18	4	0	13	0	0	7	6	0	J.
5.7	7.5	4.9	6.0	3,303	35	N.	NE., SW.	4	22	5	10	12	22	12	5	1	4	16	11	0	19	0	0	7	15	0	J.
3.8	5.3	3.5	4.2	3,152	34	N.	NE.	12	23	3	9	7	20	9	7	3	11	17	3	0	11	0	0	11	7	0	A.
3.6	5.6	3.4	4.2	3,371	23	SE.	SE.	10	16	9	20	11	11	4	2	7	12	12	6	0	9	0	0	8	0	0	S.
4.6	4.5	2.8	4.0	4,083	25	N.	N.	24	22	3	8	7	11	3	14	1	15	8	8	0	7	0	0	0	0	0	O.
4.3	3.6	1.9	3.3	3,838	41	NW.	S.	12	13	4	7	20	11	6	13	4	16	9	5	0	4	0	3	0	0	0	N.
7.4	6.9	7.1	7.1	4,479	36	NW.	S.	7	22	8	3	23	7	7	16	0	3	11	17	0	17	0	12	0	0	0	D.
4.9	5.6	4.1	4.9	50,632	..	.....	NE.	108	201	58	102	177	194	104	130	21	113	156	96	0	141	3	38	33	49	0	Y.

CHEYENNE, WYO.

[H=6,105. T=58. h=50.]

...	...	...	...	.....	..	.....	.....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	J.
...	...	...	...	.....	..	.....	.....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	F.
2.0	5.6	3.1	3.6	5,814	40	NW.	NW.	10	3	2	1	4	4	16	22	0	10	7	2	0	5	0	11	0	0	0	M.
5.2	6.9	3.9	5.3	8,613	44	S., NW.	NW.	14	2	2	6	11	5	14	35	1	9	11	10	0	11	0	18	0	1	0	A.
4.9	5.1	3.6	4.5	8,240	39	SE.	NW.	12	5	6	16	18	2	12	21	1	11	12	8	0	8	0	3	0	1	0	M.
3.7	2.9	4.1	3.9	7,788	44	S.	S.	9	10	6	11	27	6	6	12	3	13	11	6	0	7	0	0	1	5	0	J.
3.6	5.4	5.0	4.7	6,253	52	N.	S., N.	17	9	7	7	17	12	10	12	2	8	21	2	0	12	0	0	0	12	0	J.
3.4	5.6	4.1	4.4	6,602	42	N.	S.	9	4	4	16	18	10	16	13	3	5	23	3	0	16	0	0	1	13	0	A.
3.3	4.7	2.6	3.5	7,337	45	NW.	NW.	12	8	5	9	17	10	10	19	0	15	10	5	0	7	0	0	0	2	0	S.
3.1	4.7	3.4	3.7	7,832	42	NW.	NW.	17	8	4	4	9	8	11	31	1	14	14	3	0	7	1	18	0	0	0	O.
3.2	4.2	3.2	3.5	7,658	42	NW., S.	NW.	12	6	1	4	12	4	8	43	0	15	11	4	0	4	4	22	0	0	0	N.
3.2	5.1	4.5	4.3	9,805	48	S.	NW.	20	2	1	1	7	6	14	41	1	9	19	3	0	9	7	29	0	0	0	D.
...	...	...	...	.....	..	.....	.....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	Y.

CHICAGO, ILL.

[H=715. T=146. h=132.]

6.5	5.2	7.4	6.4	9,248	33	NW., W.	NW.	4	3	5	5	15	19	14	27	0	3	15	12	0	13	19	30	0	1	0	J.
7.2	7.4	5.9	6.8	7,463	42	W.	SW.	2	7	14	4	9	20	17	11	0	5	6	17	0	17	11	28	0	1	0	F.
5.7	6.0	4.0	5.2	8,271	35	N.	N.	23	12	8	3	8	14	6	19	0	9	13	9	0	6	6	27	0	0	0	M.
5.2	5.3	3.4	4.6	8,786	38	SW.	SW.	8	8	9	14	9	29	7	5	1	5	22	3	0	5	0	6	0	2	0	A.
4.2	4.2	3.0	3.8	6,915	44	SW.	NE.	19	21	11	12	9	14	4	3	0	15	8	8	0	9	0	0	0	5	0	M.
4.8	4.8	3.0	4.2	6,463	34	W.	SW.	10	16	15	13	3	17	10	6	0	12	13	5	0	7	0	0	2	3	0	J.
2.9	3.9	2.2	3.0	7,161	30	W.	SW., NE.	12	19	12	12	10	19	9	0	0	18	11	2	0	10	0	0	5	5	0	J.
5.0	3.7	3.7	4.1	6,579	30	NW., W.	E.	14	21	23	13	2	3	6	8	3	14	10	7	0	9	0	0	2	2	0	A.
6.4	6.2	5.2	5.9	7,849	36	E.	E.	8	15	18	14	6	16	7	6	0	7	11	12	0	14	9	0	1	3	0	S.
5.6	5.6	3.4	4.9	9,025	44	W.	SW.	3	4	3	5	10	32	15	21	0	12	10	9	0	8	1	9	0	1	0	O.
5.4	5.6	4.7	5.2	9,192	36	SW., NW.	SW.	3	12	4	11	4	25	17	14	0	11	8	11	1	7	2	19	0	0	0	N.
7.8	7.5	7.2	7.5	.....	30	SW., W., NW., SE.	SW.	2	8	8	11	3	35	16	10	0	4	7	20	0	13	11	25	0	0	0	D.
5.6	5.4	4.4	5.1	.....	..	.....	SW.	108	146	130	117	88	243	128	130	4	115	134	115	1	118	50	144	10	23	0	Y.

Monthly and yearly meteorological summaries—Continued.

CINCINNATI, OHIO.

[Latitude, 39° 6′ N.; longitude, 84° 30′ W.]

Months and year.	Pressure.			Temperature.								Dew point.				Relative humidity.				Precipitation.	
	Mean.	Maximum.	Minimum.	7 a. m.	3 p. m.	10 p. m.	Mean.	Maximum.	Minimum.	Mean. Maximum.	Mean. Minimum.	7 a. m.	3 p. m.	10 p. m.	Mean.	7 a. m.	3 p. m.	10 p. m.	Mean.	Total.	Max. 24 hours.
	In.	In.	In.	°	°	°	°	°	°	°	°	°	°	°	°					In.	In.
J..	29.370	29.92	28.72	25.5	33.5	29.9	29.6	66	-5	39.2	20.3	18	23	22	21	74	68	72	71	2.37	0.77
F..	29.497	30.01	28.63	36.0	41.5	40.5	39.3	70	15	49.2	32.0	31	34	32	32	82	75	74	77	7.29	2.98
M.	29.372	29.78	28.73	35.1	46.1	41.6	40.9	73	19	49.7	33.1	27	31	32	30	73	59	69	67	2.67	0.88
A..	29.353	29.78	28.67	45.7	60.5	53.7	53.3	84	27	63.3	42.8	36	38	41	38	70	47	64	60	5.86	2.21
M.	29.330	29.58	29.05	62.8	75.9	69.1	69.3	89	53	77.9	60.0	54	58	58	57	76	57	69	67	3.62	1.09
J..	29.354	29.66	29.08	68.5	80.4	74.8	74.6	91	52	82.5	64.9	60	63	62	62	75	57	65	66	2.64	1.79
J..	29.332	29.51	29.09	74.3	89.3	81.3	81.6	101	63	91.0	71.2	66	67	68	67	76	49	65	63	1.31	0.58
A..	29.339	29.61	29.09	68.0	83.5	75.7	75.7	100	54	85.7	65.7	59	60	60	60	73	46	59	60	2.81	0.94
S..	29.428	29.70	29.12	60.8	75.3	68.5	68.2	93	40	78.0	58.3	51	49	52	51	72	44	59	58	1.93	0.57
O..	29.426	29.74	29.10	45.5	60.5	53.0	53.0	81	26	63.6	43.0	36	34	38	36	69	39	58	55	0.55	0.27
N..	29.439	30.06	28.77	37.1	49.9	43.2	43.4	74	8	53.8	33.2	30	28	29	29	76	48	60	61	2.83	0.81
D..	29.434	30.04	28.92	30.7	38.0	35.4	34.7	59	1	42.3	26.4	24	27	27	26	77	66	72	72	1.80	0.98
Y..	29.390	30.06	28.63	49.2	61.2	55.6	55.3	101	-5	64.7	45.9	41	43	43	42	74	55	66	65	35.08	.....

CLEVELAND, OHIO.

[Latitude, 41° 30′ N.; longitude, 81° 42′ W.]

J..	29.222	29.80	28.64	22.4	28.0	24.3	24.9	62	-6	33.1	15.1	17	20	18	18	80	74	78	77	1.92	0.36
F..	29.385	30.05	28.53	29.0	34.3	31.6	31.6	61	9	39.9	23.6	24	28	27	27	83	80	85	83	7.73	2.19
M.	29.279	29.90	28.63	28.8	34.2	30.8	31.3	63	11	37.8	24.1	22	26	26	25	77	73	81	77	3.05	1.29
A..	29.237	29.73	28.57	41.2	49.2	44.9	45.1	76	19	54.4	35.8	33	36	36	35	74	63	73	70	1.82	0.73
M.	29.272	29.54	28.95	57.7	64.8	61.9	61.5	85	41	70.8	52.4	50	50	52	51	75	62	72	70	3.45	0.96
J..	29.272	29.65	28.95	64.6	73.1	67.7	68.5	87	51	75.8	60.0	58	59	60	59	78	64	77	73	2.43	0.75
J..	29.252	29.42	28.97	72.4	80.7	75.8	76.3	95	60	85.1	67.1	63	67	66	65	73	65	71	70	0.99	0.46
A..	29.274	29.57	28.99	64.4	73.1	69.5	69.0	94	47	77.2	61.3	56	59	57	57	74	62	66	67	3.52	1.45
S..	29.366	29.66	28.95	57.1	66.8	60.8	61.6	93	36	70.2	52.4	49	52	53	51	75	62	76	71	3.62	1.21
O..	29.299	29.70	28.86	45.9	54.8	49.7	50.1	81	24	58.5	42.0	37	39	40	39	72	58	70	67	1.80	0.80
N..	29.306	30.10	28.59	36.7	43.9	39.9	40.2	67	6	48.7	31.4	28	31	31	30	72	65	72	70	2.97	1.02
D..	29.320	30.05	28.83	29.0	33.8	31.9	31.6	57	5	37.4	24.1	23	26	26	25	79	74	79	78	2.06	0.87
Y..	29.290	30.10	28.53	45.8	53.1	49.1	49.3	95	-6	57.4	40.8	38	41	41	40	76	67	75	73	35.36	.....

COLORADO SPRINGS, COLO.

[Latitude, 38° 51′ N.; longitude, 104° 47′ W.]

J..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
F..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
M.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
A..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
M.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
J..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
J..	.....	.....	.....	56.9	77.0	67.0	67.0	90	48	80.7	54.3	49	52	52	51	76	45	61	60	4.75	1.23
A..	.....	.....	.....	56.2	76.0	66.6	66.3	90	46	79.2	53.5	47	51	50	49	75	45	59	60	4.42	1.44
S..	.....	.....	.....	51.7	71.2	60.4	61.1	84	36	74.0	49.0	43	44	46	44	73	41	60	58	0.80	0.30
O..	.....	.....	.....	38.2	58.3	46.0	47.5	82	9	61.7	34.5	30	38	32	31	72	43	61	59	0.35	0.19
N..	.....	.....	.....	30.1	50.8	35.6	38.8	71	-16	54.3	24.0	14	24	19	19	56	39	55	50	0.40	0.38
D..	.....	.....	.....	21.6	38.1	25.9	28.5	56	-14	41.7	14.7	12	17	15	15	67	46	65	60	0.08	0.03
Y..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

Monthly and yearly meteorological summaries—Continued.

CINCINNATI, OHIO.

[H=628. T=153. h=149.]

Cloudiness (in tenths).				Wind.													Number of days—										
7 a. m.	3 p. m.	10 p. m.	Mean.	Total (miles).	Maximum.	Direction.	Prevailing direction.	North.	Northeast.	East.	Southeast.	South.	Southwest.	West.	Northwest.	Calms.	Clear.	Fair.	Cloudy.	Foggy.	Rain or snow.	Max. below 32°.	Min. below 32°.	Max. above 90°.	Thunder-storms.	Auroras.	Months and year.
6.6	6.5	5.9	6.3	7,212	34	W.	SW.	8	8	1	13	4	26	15	17	1	6	11	14	0	15	11	23	0	1	0	J.
8.1	8.1	6.6	7.6	6,637	41	NW.	SE.	5	9	8	21	3	13	6	16	3	2	11	15	0	15	1	14	0	3	0	F.
6.5	6.4	6.0	6.3	7,097	40	NW.	NW.	17	19	3	17	3	7	4	20	3	5	11	15	0	12	1	16	0	0	0	M.
5.5	5.0	3.1	4.5	5,994	38	W.	SE.	5	3	10	22	9	16	5	18	2	10	16	4	0	9	0	2	0	3	0	A.
4.4	6.0	3.6	4.7	3,925	24	SW., NW.	NE.	12	26	2	22	1	6	4	9	11	7	19	5	0	14	0	0	0	5	0	M.
3.9	6.2	5.5	5.2	4,132	24	NW.	SE.	2	12	5	28	2	14	8	12	7	9	13	8	0	7	0	0	2	1	0	J.
3.4	5.1	3.5	4.0	3,435	40	NW.	SE.	10	8	4	32	1	10	9	5	14	13	13	5	0	10	0	0	16	7	0	J.
4.8	4.4	2.8	4.0	4,481	36	N.	NE.	11	21	13	11	5	12	4	7	9	11	16	4	0	7	0	0	9	5	0	A.
6.4	6.3	4.0	5.6	4,611	25	NW.	SE.	13	13	3	24	2	16	5	3	11	7	12	11	0	12	0	0	5	1	0	S.
3.7	4.7	3.2	3.9	5,751	40	SW.	NW.	14	8	1	16	2	16	8	19	0	12	14	5	0	5	0	4	0	1	0	O.
4.7	4.9	4.3	4.6	5,117	36	SW.	SE.	10	4	2	22	4	19	10	13	6	11	10	9	0	10	3	12	0	1	0	N.
7.9	7.4	6.7	7.3	5,663	32	SW.	SE.	8	4	3	28	1	22	12	12	3	3	8	20	0	11	5	22	0	0	0	D.
5.5	5.9	4.6	5.3	64,055	..	.....	SE.	115	135	55	256	37	177	90	151	79	96	154	115	0	127	21	93	32	28	0	Y.

CLEVELAND, OHIO.

[H=690. T=84. h=74.]

8.3	7.9	6.9	7.7	9,212	37	SW.	S.	3	4	6	2	26	22	18	10	2	2	10	19	0	23	14	28	0	0	0	J.
7.9	8.0	6.8	7.6	7,446	44	S.	NW.	4	6	8	14	16	4	14	17	1	2	10	16	0	19	8	21	0	2	0	F
5.7	6.4	4.6	5.6	7,109	27	SW., S.	NW.	14	10	11	6	10	5	10	26	1	10	10	11	0	13	9	27	0	1	0	M.
5.5	5.4	3.3	4.7	6,900	31	S.	W.	3	17	9	12	10	12	19	6	2	8	16	6	0	10	0	9	0	2	0	A.
4.0	4.0	4.0	4.0	5,103	27	SE., S.	NE.	6	25	9	16	11	2	2	9	13	14	9	8	0	12	0	0	0	7	0	M.
4.8	4.5	2.6	4.0	5,041	24	SE., S.	W.	10	15	8	14	12	5	16	3	7	14	11	5	0	13	0	0	0	6	0	J.
3.5	3.5	2.3	3.1	4,700	24	S.	NE.	14	20	9	15	12	4	8	3	8	17	14	0	0	5	0	0	6	4	0	J.
5.6	3.9	2.1	3.9	4,763	24	E.	SE.	10	17	19	26	3	4	3	9	2	12	14	5	0	9	0	0	3	3	0	A.
7.0	6.6	5.0	6.2	5,318	30	SW.	SE.	8	18	13	21	10	3	7	9	1	6	13	11	0	12	0	0	1	2	0	S.
8.0	6.1	6.1	6.7	7,773	36	W., SW.	SW., W	10	5	1	12	14	18	18	15	0	1	15	15	0	11	0	5	0	2	0	O.
7.9	6.6	5.9	6.8	8,420	34	NW.	SW.	3	4	5	13	18	24	12	11	0	5	9	16	0	10	5	11	0	1	0	N.
8.2	8.4	6.5	7.7	8,046	35	S.	SW.	1	2	1	16	21	22	18	10	2	2	10	19	0	19	9	25	0	0	0	D.
6.4	5.9	4.7	5.7	79,831	..	.....	SE.	86	143	99	167	163	125	145	128	39	93	141	131	0	156	45	126	10	30	0	Y.

COLORADO SPRINGS, COLO.

[H=600. T=16. h=1.]

...	...	...	...	.....	..	.....	.....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	J.
...	...	...	...	.....	..	.....	.....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	F.
...	...	...	...	.....	..	.....	.....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	M.
...	...	...	...	.....	..	.....	.....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	A.
...	...	...	...	.....	..	.....	.....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	M.
...	...	...	...	.....	..	.....	.....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	J.
2.7	5.6	5.1	4.5	.....	..	.....	.....	...	...	...	...	...	...	...	...	...	6	21	4	0	18	0	0	0	2	0	J.
3.0	4.9	4.8	4.2	.....	..	.....	.....	...	...	...	...	...	...	...	...	...	11	14	6	0	13	0	0	1	6	0	A.
3.5	4.1	3.5	3.7	.....	..	.....	.....	...	...	...	...	...	...	...	...	...	14	12	4	0	6	0	0	0	2	0	S.
3.2	4.1	3.9	3.7	.....	..	.....	.....	...	...	...	...	...	...	...	...	...	14	12	5	0	6	0	8	0	0	0	O.
2.4	4.5	2.5	3.1	.....	..	.....	.....	...	...	...	...	...	...	...	...	...	15	11	4	0	4	1	23	0	0	0	N.
2.9	4.5	2.5	3.3	.....	..	.....	.....	...	...	...	...	...	...	...	...	...	15	13	3	0	5	3	31	0	0	0	D.
...	...	...	...	.....	..	.....	.....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	Y.

Monthly and yearly meteorological summaries—Continued.

COLUMBIA, S. C.

[Latitude, 34° 0′ N.; longitude, 81° 3′ W.]

Months and year.	Pressure.			Temperature.								Dew point.				Relative humidity.				Precipitation.	
	Mean.	Maximum.	Minimum.	7 a. m.	8 p. m.	10 p. m.	Mean.	Maximum.	Minimum.	Mean. Maximum.	Mean. Minimum.	7 a. m.	8 p. m.	10 p. m.	Mean.	7 a. m.	8 p. m.	10 p. m.	Mean.	Total.	Max. 24 hours.
	In.	In.	In.	°	°	°	°	°	°	°	°	°	°	°	°					In.	In.
J	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
F	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
M	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
A	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
M	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
J	.....	.....	.....	71.3	85.7	77.0	78.0	102	54	89	68	64	65	65	65	78	52	68	66	3.97	1.73
J	.....	.....	.....	76.6	87.0	78.4	80.7	104	67	92	73	73	74	74	74	88	68	86	81	6.04	1.96
A	.....	.....	.....	71.8	83.6	74.4	76.6	96	56	86	69	69	72	70	70	91	69	86	82	5.21	1.65
S	.....	.....	.....	65.3	80.2	70.5	72.0	96	43	82	63	61	64	63	63	86	59	76	74	0.56	0.33
O	.....	.....	.....	55.4	67.9	59.3	60.9	85	36	70	51	51	54	52	52	85	64	78	76	7.43	2.77
N	.....	.....	.....	45.9	61.4	52.4	53.2	77	23	64	42	40	42	44	42	82	52	73	69	0.55	0.23
D	.....	.....	.....	40.7	51.7	46.6	46.3	67	23	53	37	38	41	39	39	89	68	78	78	3.73	1.12
Y	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

COLUMBUS, OHIO.

[Latitude, 39° 58′ N.; longitude, 83° 0′ W.]

J	29.142	29.68	28.56	23.0	30.2	27.2	26.8	66	-5	36.1	17.5	15	19	19	18	73	64	71	70	2.35	0.66
F	29.282	29.84	28.49	32.8	38.9	36.5	36.1	64	13	44.6	28.2	25	30	30	28	73	73	77	74	6.48	1.55
M	29.158	29.67	28.54	31.7	42.1	37.1	37.0	68	14	45.5	29.1	24	27	28	26	72	57	71	67	2.56	1.66
A	29.137	29.60	28.53	43.7	58.4	51.5	51.2	83	24	61.6	40.1	36	35	36	36	76	46	57	60	3.44	1.83
M	29.139	29.40	28.84	60.9	75.6	65.8	67.4	90	50	77.7	57.6	52	54	55	54	75	49	70	65	2.97	0.68
J	29.155	29.50	28.86	65.3	79.3	70.4	71.7	91	49	81.4	61.1	58	56	59	58	77	47	69	65	2.82	0.91
J	29.139	29.30	28.88	72.2	88.5	78.7	79.8	100	61	90.3	68.9	64	62	67	64	78	43	68	63	1.45	0.67
A	29.153	29.42	28.88	65.1	80.8	71.7	72.5	97	42	82.2	59.5	57	54	57	56	75	42	61	60	2.21	0.77
S	29.242	29.54	28.85	58.5	74.0	65.4	66.0	93	36	75.7	52.4	50	52	52	52	75	50	64	63	1.35	0.50
O	29.214	29.56	28.86	43.9	58.9	51.1	51.3	83	20	61.9	40.9	36	36	38	37	75	46	63	61	0.30	0.10
N	29.226	29.90	28.55	36.0	47.4	40.8	41.4	74	3	51.2	32.2	29	30	31	30	77	55	70	67	2.45	0.60
D	29.226	29.89	28.75	29.4	36.2	33.4	33.0	57	1	39.9	25.6	23	25	26	25	79	65	74	72	1.87	0.89
Y	29.184	29.90	28.49	46.9	59.2	52.5	52.9	100	-5	62.3	42.8	39	40	42	40	75	53	68	66	30.25	.....

CONCORDIA, KANS.

[Latitude, 39° 35′ N.; longitude, 97° 41′ W.]

J	28.518	29.18	27.89	14.4	28.4	22.3	21.7	60	-19	33.8	10.3	9	16	13	13	79	62	71	71	0.61	0.23
F	28.648	29.22	27.47	18.7	29.7	24.6	24.3	71	-15	35.5	12.8	15	21	17	18	86	72	75	78	0.72	0.14
M	28.632	29.16	28.32	33.9	53.0	40.3	42.4	82	18	56.4	29.4	26	38	29	31	74	59	66	66	0.23	0.18
A	28.472	28.96	27.95	48.0	64.5	55.3	55.9	93	20	68.5	42.6	40	47	44	44	76	58	67	67	1.95	0.76
M	28.506	28.87	27.84	56.6	75.9	66.0	66.2	95	36	78.9	54.2	50	50	50	50	79	43	60	61	6.08	2.28
J	28.485	28.71	28.32	65.0	80.6	72.4	72.7	97	46	83.0	62.9	59	61	61	60	83	53	69	68	3.13	1.48
J	28.531	28.72	28.38	67.9	87.4	77.8	77.7	102	57	90.8	65.8	61	59	60	60	78	41	58	59	2.36	1.43
A	28.522	28.72	28.30	65.7	80.7	72.7	73.0	101	52	83.5	64.2	60	61	62	61	82	54	71	69	3.88	1.16
S	28.584	28.89	28.18	59.2	74.5	65.4	66.4	94	40	77.3	57.7	54	56	56	56	84	55	74	71	3.62	1.32
O	28.621	29.06	28.07	43.0	63.3	52.3	52.9	92	21	65.2	40.5	35	36	38	36	73	38	59	57	0.95	0.95
N	28.624	29.02	28.14	33.3	50.5	41.2	41.7	81	-15	54.1	29.1	22	25	24	24	65	41	55	53	1.10	0.69
D	28.580	29.12	27.87	21.6	32.5	25.8	26.6	53	-10	37.0	17.5	14	19	16	16	72	60	69	67	0.63	0.29
Y	28.560	29.22	27.47	43.9	60.1	51.3	51.8	102	-19	63.7	40.6	37	41	39	39	78	53	66	66	25.26	.....

Monthly and yearly meteorological summaries—Continued.

COLUMBIA, S. C.

[H=000. T=72. h=68.]

Cloudiness (in tenths).				Wind.													Number of days—										Months and year.
7 a. m.	3 p. m.	10 p. m.	Mean.	Total (miles).	Maximum.	Direction.	Prevailing direction.	North.	Northeast.	East.	Southeast.	South.	Southwest.	West.	Northwest.	Calms.	Clear.	Fair.	Cloudy.	Foggy.	Rain or snow.	Max. below 32°.	Min. below 32°.	Max. above 90°.	Thunder-storms.	Auroras.	
...	...	...	...	...	..	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	J.
...	...	...	...	...	..	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	F.
...	...	...	...	...	..	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	M.
...	...	...	...	...	..	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	A.
...	...	...	...	...	..	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	M.
4.6	5.1	3.5	4.2	...	..	...	...	...	...	...	...	...	...	...	...	...	10	12	4	0	9	0	0	11	4	0	J.
5.9	7.1	5.4	6.1	...	..	...	...	...	...	...	...	...	...	...	...	...	2	20	9	0	19	0	0	16	17	0	J.
5.3	6.0	4.0	5.1	...	..	...	...	...	...	...	...	...	...	...	...	...	11	11	9	0	12	0	0	10	13	0	A.
4.7	5.2	2.5	4.1	...	..	...	...	...	...	...	...	...	...	...	...	...	13	14	3	0	5	0	0	5	2	0	S.
4.4	5.1	4.1	4.5	...	..	...	...	...	...	...	...	...	...	...	...	...	16	6	9	0	11	0	0	0	0	0	O.
3.2	3.2	2.3	2.9	...	..	...	...	...	...	...	...	...	...	...	...	...	16	11	3	0	4	0	4	0	0	0	N.
6.0	6.1	6.2	6.1	...	..	...	...	...	...	...	...	...	...	...	...	...	6	11	14	0	11	0	6	0	0	0	D.
...	...	...	...	...	..	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	Y.

COLUMBUS, OHIO.

[H=812. T=81. h=70.]

7.6	7.8	5.8	7.1	7,344	38	W.	S.	4	7	3	8	26	16	22	7	0	3	14	14	0	19	11	24	0	0	0	J.
7.4	7.9	7.1	7.5	7,582	56	W.	S.	6	7	8	11	16	13	15	8	0	2	11	15	0	21	5	21	0	2	0	F.
6.9	6.9	6.9	6.9	6,918	51	SW.	NW.	13	10	8	5	12	7	10	28	0	3	12	16	0	13	2	20	0	1	0	M.
5.8	5.4	4.1	5,1	6,626	46	W.	SW.	4	6	8	10	14	23	17	8	0	8	16	6	0	8	0	5	0	3	0	A.
4.9	6.1	3.4	4.8	4,341	32	S.	NE.	14	18	13	12	7	9	8	11	1	11	14	6	0	12	0	0	0	10	0	M
5.0	5.6	2.5	4.4	4,680	33	W.	SW.	9	12	12	12	10	14	12	7	2	12	13	5	0	9	0	0	4	5	0	J.
3.1	4.9	4.1	4.0	3,831	45	N.	S.	8	15	6	7	24	15	8	8	2	11	16	4	0	9	0	0	16	8	0	J.
4.3	4.0	3.1	3.8	4,308	31	NW.	NE.	20	24	10	5	7	8	9	8	2	13	14	4	0	9	0	0	8	5	0	A
5.9	5.7	4.7	5.4	4,484	30	W.	N.	18	14	16	8	12	11	6	5	0	6	16	8	0	10	0	0	2	1	0	S.
4.7	5.3	2.6	4.2	5,922	48	S.	S.	17	1	1	4	22	14	21	12	1	12	13	6	0	5	0	6	0	0	0	O
5.3	5.4	4.0	4.9	5,373	32	SW.	S.	2	6	2	8	28	13	20	7	4	11	8	11	0	10	5	13	0	2	0	N
7.0	7.1	6.7	6.9	6,128	39	SW.	S. W.	3	4	6	17	21	16	21	5	0	4	11	16	0	14	5	20	0	0	0	D
5.7	6.0	4.6	5.4	67,537	..	.....	S.	118	124	93	107	199	159	169	114	12	96	158	111	0	139	28	109	30	37	0	Y

CONCORDIA, KANS.

[H=1,384. T=42. h=34.]

3.4	4.5	2.4	3.4	6,481	26	N., NW., SW.	N.	17	6	5	3	16	12	10	14	10	17	11	3	0	7	11	31	0	0	0	J.
5.0	5.5	4.3	4.9	5,076	47	NW.	N.	15	11	7	5	11	6	4	8	17	9	12	7	0	7	12	28	0	0	0	F.
4.2	3.8	1.5	3.2	6,168	39	NW.	N.	20	7	8	4	7	12	7	11	17	17	10	4	0	4	1	22	0	0	0	M.
4.5	4.8	2.9	4.1	4,536	34	S., N.	S.	3	3	3	13	20	6	11	15	16	12	13	5	0	8	0	3	1	1	0	A.
3.6	4.5	3.7	3.9	6,586	45	E.	S	11	10	5	14	17	12	1	8	15	15	10	6	0	6	0	0	2	5	0	M.
5.3	5.9	3.7	5.0	5,813	38	N.	SE.	11	6	15	29	19	3	1	1	5	9	14	7	0	9	0	0	5	2	0	J.
4.1	4.4	2.5	3.7	4,951	38	E.	S.	10	11	9	17	21	6	3	4	12	14	14	3	0	10	0	0	15	6	0	J.
5.5	6.0	4.4	5.3	5,547	40	NE.	SE.	12	12	9	24	21	2	4	6	9	9	14	8	0	9	0	0	9	4	0	A.
4.3	4.7	4.4	4.5	5,903	26	N.	S.	13	9	16	14	19	7	0	4	8	13	10	7	0	7	0	0	4	2	0	S.
3.4	3.3	1.9	2.9	6,013	38	S.	N.	20	7	4	8	17	9	9	12	7	17	12	2	0	1	0	4	2	0	0	O.
3.1	4.1	2.3	3.2	5,593	32	SW., W., N	N.	22	6	5	6	15	11	7	8	10	16	9	5	0	3	2	12	0	1	0	N.
3.7	5.6	2.7	4.0	6,061	36	S., NW.	NW.	13	5	7	8	12	11	9	22	6	15	10	6	0	3	6	29	0	0	0	D.
4.2	4.8	3.1	4.0	68,728	..	.....	S.	167	93	93	145	195	97	66	107	132	163	139	63	0	74	32	129	38	21	0	Y.

Monthly and yearly meteorological summaries—Continued.

CORPUS CHRISTI, TEX.

[Latitude, 27° 49′ N.; longitude, 97° 25′ W.]

Months and year.	Pressure.			Temperature.								Dew point.				Relative humidity.				Precipitation.	
	Mean.	Maximum.	Minimum.	7 a. m.	3 p. m.	10 p. m.	Mean.	Maximum.	Minimum.	Mean. Maximum.	Mean. Minimum.	7 a. m.	3 p. m.	10 p. m.	Mean.	7 a. m.	3 p. m.	10 p. m.	Mean.	Total.	Max. 24 hours.
	In.	In.	In.	°	°	°	°	°	°	°	°	°	°	°	°					In.	In.
J	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
F	30.105	30.61	29.66	60.6	66.7	62.8	63.4	86	33	70.0	56.4	56	56	56	56	87	72	81	80	0.17	0.11
M	30.054	30.42	29.75	60.8	69.7	65.7	65.4	90	46	73.1	58.2	56	55	56	56	87	64	74	75	1.61	0.80
A	29.992	30.27	29.57	66.6	72.8	70.8	70.1	88	46	74.5	65.4	62	62	64	63	86	73	83	80	T	T
M	29.940	30.15	29.63	72.4	78.9	76.1	75.8	96	57	81.2	70.4	69	69	70	70	90	74	82	82	1.26	0.88
J	29.892	30.02	29.76	77.2	82.5	80.3	80.0	95	70	83.7	75.3	74	73	74	74	89	74	80	81	3.80	1.60
J	29.995	30.14	29.87	78.0	85.3	82.5	81.9	93	72	87.4	76.4	74	75	76	75	88	73	84	80	0.10	0.05
A	29.913	30.03	29.79	78.8	84.8	83.0	82.2	91	72	86.5	77.5	75	75	76	76	89	74	81	81	2.84	1.84
S	29.958	30.10	29.70	76.1	82.2	80.0	79.4	88	59	83.5	73.1	72	72	73	72	87	72	79	79	9.24	3.95
O	30.025	30.34	29.67	66.0	73.7	70.3	70.0	84	49	75.7	62.8	61	61	63	62	84	67	78	76	2.99	1.03
N	30.097	30.49	29.89	58.8	67.7	65.0	63.8	77	33	70.4	56.0	55	58	60	58	89	72	85	82	0.66	0.47
D	30.062	30.56	29.63	49.0	55.9	58.0	52.6	76	24	59.8	45.3	46	48	48	47	90	76	86	84	5.07	1.66
Y	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

CRETE, NEBR.

[Latitude, 40° 38′ N.; longitude, 96° 59′ W.]

J	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
F	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
M	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
A	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
M	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
J	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
J	.....	.....	.....	66.8	87.9	75.8	76.8	103	53	89.9	64.9	61	63	64	63	83	46	68	66	1.45	0.68
A	.....	.....	.....	62.3	81.4	71.1	71.6	102	40	83.7	60.5	58	61	62	60	86	54	73	71	3.76	2.25
S	.....	.....	.....	57.0	78.8	63.4	64.7	94	37	76.1	55.1	54	56	55	55	87	56	75	73	2.28	1.15
O	.....	.....	.....	40.3	61.7	49.1	50.4	90	16	64.4	37.4	36	38	37	37	83	44	65	64	0.77	0.77
N	.....	.....	.....	30.1	48.3	37.3	38.6	80	-17	51.8	25.5	26	29	28	27	84	52	71	69	1.42	1.23
D	.....	.....	.....	18.5	28.8	21.7	23.0	50	-15	33.0	14.1	16	20	18	18	89	74	86	83	0.87	0.46
Y	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

DAVENPORT, IOWA.

[Latitude, 41° 30′ N.; longitude, 90° 38′ W.]

J	29.326	29.90	28.58	9.3	17.1	13.3	13.2	50	-26	26.4	2.8	5	10	8	8	81	76	81	79	1.43	0.87
F	29.459	30.17	28.48	19.5	26.8	25.1	23.8	55	-10	35.8	14.9	16	20	21	19	85	77	85	82	4.87	1.64
M	29.420	29.92	28.82	29.1	39.5	34.4	34.3	70	9	44.5	26.9	23	27	27	26	79	62	74	72	0.77	0.32
A	29.274	29.68	28.63	48.8	61.1	51.9	52.3	82	16	64.4	40.9	34	35	37	36	70	40	60	57	1.17	0.71
M	29.307	29.61	28.84	60.5	74.2	66.7	67.1	90	44	77.2	56.5	51	50	52	51	73	44	62	60	1.76	0.63
J	29.318	29.64	29.11	66.3	80.3	72.4	73.0	97	51	83.2	62.4	59	57	60	59	78	47	67	64	1.66	0.72
J	29.309	29.49	29.11	70.6	86.5	77.0	78.0	99	56	88.7	67.2	62	60	63	62	76	43	63	60	3.09	1.08
A	29.338	29.51	29.11	64.0	80.5	72.1	72.2	98	46	82.8	61.9	56	55	58	56	77	44	64	62	3.23	1.58
S	29.392	29.78	29.07	57.0	71.6	64.6	64.4	93	42	75.0	55.7	51	52	54	53	82	54	71	69	5.45	2.92
O	29.399	29.91	28.90	41.7	54.5	46.2	47.5	83	17	57.7	38.9	35	36	37	36	78	52	73	68	3.41	1.30
N	29.397	29.97	28.75	31.5	43.9	36.4	37.3	71	0	48.4	28.9	26	27	29	27	81	55	75	70	1.13	0.38
D	29.371	30.03	28.66	21.5	27.4	23.3	24.1	54	-15	33.4	16.2	18	20	19	19	89	77	85	84	3.26	0.72
Y	29.359	30.17	28.48	42.9	55.3	48.6	48.9	99	-26	59.8	39.4	36	38	39	38	79	56	72	69	31.22	.....

Monthly and yearly meteorological summaries—Continued.

CORPUS CHRISTI, TEX.

[H=18. T=42. h=34.]

Cloudiness (in tenths).				Wind.													Number of days—										
7 a. m.	3 p. m.	10 p. m.	Mean.	Total (miles).	Maximum.	Direction.	Prevailing direction.	North.	Northeast.	East.	Southeast.	South.	Southwest.	West.	Northwest.	Calms.	Clear.	Fair.	Cloudy.	Foggy.	Rain or snow.	Max. below 32°.	Min. below 32°.	Max. above 90°.	Thunder-storms.	Auroras.	Months and year.
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	J.
6.9	7.9	5.0	6.6	9,056	40	N.	SE.	9	17	5	39	6	0	0	8	0	1	19	8	0	3	0	0	0	0	0	F.
3.7	3.5	2.4	3.2	9,263	35	SE.	SE.	12	7	7	46	8	2	3	7	1	15	14	2	0	4	0	0	0	2	0	M.
4.5	4.8	2.3	3.9	11,594	32	SE., N.	SE.	4	7	14	57	3	1	1	3	0	10	17	3	0	0	0	0	0	1	0	A.
4.5	3.8	2.8	3.7	11,193	37	SE.	SE.	3	2	20	53	9	2	1	3	0	15	13	3	0	6	0	0	1	4	0	M.
4.4	4.2	3.0	3.9	10,382	32	NE.	SE.	8	10	30	35	4	2	0	1	0	11	17	2	0	10	0	0	1	5	0	J.
3.3	4.1	1.7	3.0	8,773	40	E.	SE.	0	0	11	62	14	3	1	2	0	16	15	0	0	3	0	0	2	4	0	J.
4.0	4.4	2.6	3.7	9,114	34	E.	SE.	2	1	20	57	9	1	2	1	0	14	13	4	0	4	0	0	1	2	0	A.
6.0	5.8	3.2	5.0	9,096	45	NE.	E.	15	8	27	25	7	2	1	5	0	11	12	7	0	19	0	0	0	4	0	S.
6.4	6.3	4.9	5.9	9,537	38	N.	N.	31	10	11	24	2	1	1	13	0	10	7	14	0	10	0	0	0	3	0	O.
5.1	5.9	4.0	5.0	7,008	60	NE.	E.	19	11	21	19	5	1	4	9	1	12	8	10	0	4	0	0	0	0	0	N.
6.1	6.6	5.5	6.1	8,621	39	NW.	N.	26	6	7	15	4	4	10	21	0	9	6	15	0	14	1	4	0	0	0	D.
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	Y.

CRETE, NEBR.

[H=... T=4. h=2.]

...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	J.
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	F.
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	M.
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	A.
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	M.
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	J.
5.8	3.9	3.9	4.5	...	...	...	...	...	...	...	...	...	...	...	...	...	5	11	4	0	5	0	0	9	3	0	J.
5.3	6.1	4.7	5.4	...	...	...	...	...	...	...	...	...	...	...	...	...	9	14	8	0	12	0	0	9	2	0	A.
5.7	5.4	4.6	5.3	...	...	...	...	...	...	...	...	...	...	...	...	...	8	12	10	0	9	0	0	3	6	0	S.
3.8	4.3	4.1	4.1	...	...	...	...	...	...	...	...	...	...	...	...	...	13	12	6	0	1	1	10	0	0	0	O.
3.5	4.4	2.8	3.6	...	...	...	...	...	...	...	...	...	...	...	...	...	16	8	6	0	4	4	17	0	1	0	N.
5.3	6.3	4.3	5.3	...	...	...	...	...	...	...	...	...	...	...	...	...	7	15	9	0	6	10	30	0	0	0	D.
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	Y.

DAVENPORT, IOWA.

[H=615. T=72. h=64.]

5.5	6.0	4.0	5.1	7,121	28	SW.	NW.	5	12	5	1	14	15	19	21	1	9	16	6	0	11	17	30	0	0	0	J.
5.9	6.4	5.1	5.8	6,295	34	W.	NW.	6	10	17	4	8	6	15	18	0	8	8	12	0	15	9	27	0	2	0	F.
4.9	7.0	2.7	4.9	6,365	32	NW.	NW.	12	16	13	8	4	10	5	25	0	11	14	6	0	7	1	25	0	0	0	M.
4.5	6.1	3.5	4.7	7,752	36	NW.	S., SW.	6	2	8	7	22	22	10	13	0	7	19	4	0	7	0	7	0	1	0	A.
4.0	5.8	3.5	4.4	5,396	40	SW.	NE.	7	18	11	5	15	10	16	8	3	11	14	6	0	12	0	0	0	10	0	M.
4.9	5.4	3.9	4.7	4,763	38	W.	E.	3	14	22	6	10	20	1	12	2	10	13	7	0	10	0	0	3	4	0	J.
3.2	4.7	2.7	3.5	4,606	35	NW.	SW.	13	11	13	8	8	22	5	11	2	17	8	6	0	11	0	0	13	8	0	J.
6.1	5.5	3.4	5.0	4,799	45	N.	E.	13	7	20	15	5	13	2	14	4	7	19	5	0	15	0	0	7	7	0	A.
5.7	5.6	4.2	5.2	5,318	25	NW., SE.	SW.	11	16	13	12	8	18	3	8	1	7	13	9	0	13	0	0	2	2	0	S.
4.6	3.5	2.5	3.5	6,316	36	W, SW.	NW.	7	3	6	8	10	13	12	31	3	15	12	4	0	9	0	7	0	2	0	O.
4.0	4.4	2.5	3.6	6,403	42	NW., SW.	NW.	2	15	8	6	9	14	11	25	0	16	8	6	0	7	2	15	0	1	0	N.
4.6	6.1	5.5	5.4	6,309	36	E., W., SW.	SW.	4	8	6	8	9	19	16	13	10	7	16	8	0	11	11	28	0	0	0	D.
4.8	5.5	3.6	4.6	71,443	..	.....	NW.	89	132	142	88	122	182	115	199	26	125	160	79	0	128	40	139	25	37	0	Y.

Monthly and yearly meteorological summaries—Continued.

DEADWOOD, DAK.

[Latitude, 44° 23′ N.; longitude, 103° 43′ W.]

Months and year.	Pressure.			Temperature.								Dew point.				Relative humidity.				Precipitation.	
	Mean.	Maximum.	Minimum.	7 a. m.	3 p. m.	10 p. m.	Mean.	Maximum.	Minimum.	Mean. Maximum.	Mean. Minimum.	7 a. m.	3 p. m.	10 p. m.	Mean.	7 a. m.	3 p. m.	10 p. m.	Mean.	Total.	Max. 24 hours.
	In.	In.	In.	°	°	°	°	°	°	°	°	°	°	°	°					In	In.
J ..	25.126	25.60	24.62	17.8	24.5	18.4	20.2	45	-18	29.0	11.2	13	18	14	15	81	75	83	80	3.18	0.83
F ..	25.232	25.56	24.82	11.2	19.8	15.2	15.4	58	-29	27.4	4.5	6	11	9	9	79	71	77	76	0.74	0.23
M .	25.361	25.80	24.96	30.7	42.3	36.6	36.5	65	10	47.9	27.6	24	29	28	27	76	60	71	69	2.01	0.68
A ..	25.266	25.59	24.85	36.3	47.1	40.3	41.2	73	16	50.6	33.5	30	33	33	32	78	62	75	72	6.47	2.44
M .	25.375	25.78	24.98	47.2	60.2	54.5	54.0	80	31	64.7	44.6	40	43	45	42	76	57	71	68	4.25	2.06
J ..	25.367	25.69	25.12	56.1	70.9	63.4	63.5	92	40	74.0	52.7	49	54	53	52	77	56	70	68	2.16	0.74
J ..	25.472	25.63	25.27	58.3	73.3	65.7	65.8	90	45	76.5	55.3	52	58	57	56	82	62	76	73	3.70	1.12
A ..	25.421	25.68	25.07	54.7	68.0	61.4	61.4	88	41	77.1	52.4	51	58	56	55	87	71	83	80	3.22	1.51
S ..	25.446	25.72	25.10	49.7	64.7	55.8	56.7	80	33	68.3	46.9	45	54	50	50	85	70	81	78	1.75	0.70
O ..	25.438	25.82	24.88	35.9	46.9	39.5	40.8	75	-7	52.7	31.3	31	38	34	34	84	72	81	79	2.05	1.08
N ..	25.368	25.57	24.88	31.0	41.8	32.2	35.0	64	-11	45.6	24.9	25	30	25	26	78	65	76	73	0.48	0.30
D ..	25.272	25.70	24.80	19.4	27.0	21.3	22.6	49	-11	32.4	14.0	15	19	16	17	83	74	82	80	1.65	0.40
Y ..	25.345	25.82	24.62	37.4	48.9	42.0	42.8	92	-29	53.8	33.2	33	37	35	34	80	66	77	75	31.66	.....

DENVER, COLO.

[Latitude, 39° 45′ N.; longitude, 105° 00′ W.]

J ..	24.581	25.04	24.21	25.7	37.1	31.2	31.3	67	-18	44.1	17.4	15	13	16	15	66	39	55	54	0.67	0.34
F ..	24.621	25.02	24.07	22.8	40.2	33.0	32.0	71	-3	46.8	16.7	13	12	15	13	66	39	49	51	0.30	0.22
M .	24.766	25.13	24.47	35.1	54.9	47.7	45.9	75	13	60.0	31.9	22	17	24	21	60	26	42	43	0.23	0.08
A ..	24.657	24.99	24.28	40.1	56.4	49.6	48.7	82	20	60.3	36.3	26	24	26	26	60	34	47	47	2.16	1.26
M .	24.751	25.07	24.29	48.1	68.4	61.9	59.5	89	31	73.5	45.0	37	34	36	36	68	33	41	47	1.13	0.85
J ..	24.722	25.01	24.51	56.9	79.5	71.6	69.3	96	44	83.4	54.6	43	42	44	43	62	30	40	44	0.53	0.15
J ..	24.858	25.02	24.68	57.7	79.2	70.2	69.0	92	50	82.8	56.6	47	45	52	48	70	34	54	53	2.49	1.05
A ..	24.789	25.06	24.60	56.3	78.7	68.7	67.9	95	47	83.0	54.5	47	43	50	47	73	34	56	55	2.68	1.30
S ..	24.839	25.08	24.59	51.6	73.6	64.1	63.1	88	35	77.1	49.5	44	47	50	47	77	41	62	60	0.97	0.39
O ..	24.829	25.20	24.23	38.1	58.5	48.0	48.2	85	8	62.4	34.2	27	33	33	31	67	41	59	56	0.97	0.56
N ..	24.774	24.98	24.37	30.1	51.8	39.2	40.4	74	-14	56.0	25.8	21	26	19	22	68	41	49	53	0.22	0.14
D ..	24.675	25.11	24.02	20.8	38.1	27.4	28.8	67	-14	44.0	16.7	9	13	12	12	61	39	56	52	0.14	0.05
Y ..	24.738	25.20	24.02	40.3	59.7	51.0	50.3	96	-18	64.4	36.6	29	29	31	30	67	36	51	51	12.49	....

DES MOINES, IOWA.

[Latitude, 41° 35′ N.; longitude, 93° 37′ W.]

J ..	29.075	29.72	28.38	6.5	16.0	12.0	11.5	42	-24	21.7	0.0	3	10	8	7	84	78	84	82	0.83	0.25
F ..	29.210	29.92	28.22	13.7	23.2	21.4	19.4	54	-15	29.9	9.5	10	17	18	15	85	78	86	83	1.65	0.47
M .	29.175	29.69	28.57	29.7	42.5	34.9	35.7	72	10	45.3	27.1	24	29	22	27	80	60	75	72	1.79	0.85
A ..	29.002	29.38	28.39	43.6	61.5	52.4	52.5	87	18	64.4	40.8	35	36	38	36	74	42	60	58	2.48	1.69
M	29.045	29.41	28.41	56.0	75.6	65.5	65.7	93	39	78.4	53.6	48	49	52	49	74	41	62	59	2.31	0.90
J ..	29.054	29.33	28.86	63.2	80.8	71.6	71.9	94	45	83.3	61.5	56	60	62	60	78	52	72	67	2.25	1.12
J ..	29.064	29.23	28.87	67.6	87.8	77.1	77.5	102	52	89.7	65.6	61	61	63	62	79	42	63	62	1.94	0.65
A ..	29.080	29.26	28.87	63.0	81.6	72.5	72.4	101	46	83.9	61.4	56	58	59	58	80	47	65	64	2.66	0.67
S ..	29.140	29.49	28.70	56.5	71.5	63.3	63.8	92	40	74.1	54.9	51	53	54	53	84	55	74	71	5.36	1.66
O ..	29.150	29.65	28.70	40.1	57.1	47.9	48.4	83	14	60.2	38.2	34	37	38	36	80	49	69	66	1.40	1.24
N ..	29.150	29.60	28.69	29.8	45.2	36.8	37.3	73	-9	47.8	25.7	24	28	27	26	80	54	68	67	0.52	0.42
D ..	29.114	29.79	28.41	20.3	26.4	22.1	22.9	50	-13	31.8	14.5	17	18	18	18	88	72	84	81	1.41	0.33
Y ..	29.105	29.92	28.22	40.8	55.8	48.1	48.2	102	-24	59.2	37.7	35	38	39	37	80	56	72	69	24.60	.....

DETROIT, MICH.

[Latitude; 42° 20′ N.; longitude, 83° 3′ W.]

J ..	29.233	29.76	28.57	21.3	27.0	22.6	23.6	54	-3	24.9	16.0	15	17	15	16	77	65	73	72	1.31	0.31
F ..	29.416	30.10	28.52	25.3	31.6	27.9	28.3	54	1	34.8	21.5	21	24	22	22	83	74	79	79	4.16	1.24
M .	29.325	29.96	29.62	26.6	35.7	30.6	31.0	52	7	37.4	23.6	21	27	25	24	78	70	80	76	1.44	0.49
A ..	29.266	29.79	28.60	41.5	52.3	45.6	46.5	72	18	54.4	37.1	35	39	37	37	79	61	73	71	1.19	0.58
M .	29.307	29.60	28.93	58.0	70.5	61.6	63.4	87	45	72.1	53.7	49	52	51	50	73	54	69	65	2.11	1.02
J ..	29.300	29.70	28.95	63.8	75.4	66.4	68.5	88	50	76.0	59.5	58	59	57	58	83	58	72	71	4.19	1.51
J ..	29.282	29.48	28.96	69.5	84.2	74.0	75.9	101	54	85.9	65.9	61	63	63	62	76	50	70	65	1.31	0.66
A ..	29.322	29.60	29.05	62.3	75.5	67.1	68.3	93	49	76.9	59.9	55	55	55	55	78	52	67	66	2.30	1.06
S ..	29.409	29.72	28.97	54.4	66.7	59.0	60.0	90	34	68.6	51.5	49	52	51	51	84	60	76	73	4.41	1.18
O ..	29.329	29.76	28.86	42.6	52.7	47.2	47.5	75	22	55.5	40.7	36	39	40	38	79	62	76	72	1.49	0.50
N ..	29.325	30.16	28.56	34.6	42.3	38.3	38.4	64	16	45.6	31.1	28	29	32	30	78	62	78	73	2.72	1.46
D ..	29.342	30.11	28.85	27.6	31.5	29.5	29.5	55	7	34.5	24.2	24	24	25	24	86	75	83	81	2.34	0.71
Y ..	29.321	30.16	28.52	44.0	53.8	47.5	48.4	101	-3	55.6	40.4	38	40	39	39	80	62	74	72	28.97	.....

Monthly and yearly meteorological summaries—Continued.

DEADWOOD, DAK.

[H=4,660. T=24. h=52.]

Cloudiness (in tenths).				Wind.													Number of days—										
7 a. m.	3 p. m.	10 p. m.	Mean.	Total (miles).	Maximum.	Direction.	Prevailing direction.	North.	Northeast.	East.	Southeast.	South.	Southwest.	West.	Northwest.	Calms.	Clear.	Fair.	Cloudy.	Foggy.	Rain or snow.	Max. below 32°.	Min. below 32°.	Max. above 90°.	Thunder-storms.	Auroras.	Months and year.
3.3	4.8	2.9	3.7	4,729	24	SW.	SW.	5	22	0	0	4	56	4	2	0	15	12	4	0	18	13	31	0	0	0	J.
2.2	4.5	1.9	2.9	4,397	32	SW.	SW.	16	22	1	1	8	28	4	4	0	17	10	1	0	7	14	27	0	0	0	F.
3.6	4.7	4.7	4.3	4,057	30	SW.	SW.	4	25	1	2	8	42	4	7	0	12	11	8	0	13	2	19	0	0	0	M.
5.4	5.9	4.2	5.2	3,700	23	NE.	SW.	8	22	1	3	10	42	2	2	0	9	13	8	0	14	0	15	0	0	0	A.
2.4	4.6	3.8	3.9	4,501	24	SW.	SW.	4	21	0	2	15	43	5	3	0	12	14	5	0	10	0	1	0	0	0	M.
2.8	3.7	4.0	3.5	4,546	34	S.	SW.	2	19	1	2	28	31	4	1	2	17	9	4	0	9	0	0	1	4	0	J.
3.5	5.9	4.6	4.7	3,349	32	W.	SW.	0	19	0	1	9	32	22	5	5	9	16	6	0	12	0	0	0	4	0	J.
4.7	5.7	4.3	4.9	3,343	24	S.	SW.	0	22	1	3	4	38	19	4	2	7	15	9	0	12	0	0	0	4	0	A.
3.0	4.1	2.3	3.1	3,740	24	SW., NW.	W.	0	14	3	3	0	29	31	6	4	15	11	4	0	6	0	0	0	1	0	S.
5.5	5.9	4.1	5.2	3,317	25	NW.	SW.	0	17	4	0	0	33	23	15	1	9	14	8	0	12	1	14	0	0	0	O.
3.2	5.7	3.8	4.2	2,967	25	NW.	W.	2	18	2	0	1	24	27	12	4	12	14	4	0	5	4	16	0	0	0	N.
4.5	6.4	4.4	4.5	2,109	20	SW.	SW.	3	13	1	1	0	19	20	14	22	6	18	7	0	14	9	29	0	0	0	D.
3.8	5.2	3.8	4.3	44,755	..	.....	SW.	44	234	15	18	87	417	165	75	40	140	157	68	0	132	43	152	1	13	0	Y.

DENVER, COLO.

[H=5,281. T=86. h=79.]

2.8	4.3	2.9	3.3	8,295	56	NW., W	S., W.	7	12	4	2	23	11	23	11	0	12	19	0	0	8	4	28	0	0	0	J.
1.8	4.5	1.7	2.6	5,848	64	W.	S.	7	11	0	6	23	15	9	12	1	18	9	1	0	5	5	28	0	0	0	F.
3.5	5.0	4.2	4.2	6,055	44	W.	S.	12	16	4	4	20	9	17	11	0	10	18	3	0	4	1	13	0	1	0	M.
5.2	6.0	4.3	5.2	6,755	47	W.	S.	16	7	3	8	23	8	16	7	2	8	14	8	0	10	0	9	0	1	0	A.
3.0	5.1	4.5	4.2	5,672	28	S.	S.	16	9	7	9	36	4	6	4	2	12	15	4	0	5	0	3	0	0	0	M.
2.9	4.2	4.8	4.0	5,934	42	N.	S.	17	7	7	6	35	7	3	7	1	10	17	3	0	6	0	0	3	7	0	J.
2.4	6.0	4.7	4.4	5,038	36	W.	S.	13	11	6	7	31	9	5	8	3	10	17	4	0	9	0	0	5	15	0	J.
3.0	4.5	5.9	4.5	5,013	48	N?	S.	20	8	9	5	27	4	8	11	1	11	16	4	0	9	0	0	6	9	0	A.
2.9	4.4	4.1	3.8	4,990	42	W.	S.	23	6	9	4	29	7	6	4	2	12	15	3	0	9	0	0	0	3	0	S.
3.0	4.4	4.2	3.9	4,898	42	NW.	S.	25	18	4	3	28	6	4	4	1	13	14	4	0	9	1	9	0	1	0	O.
1.6	4.5	2.7	2.9	5,106	36	NW.	S.	18	9	4	3	40	3	4	8	1	17	9	4	0	2	2	18	0	0	0	N.
1.8	4.3	3.6	3.2	5,186	36	S., W.	S.	12	8	7	4	40	2	6	12	2	17	11	3	0	5	4	30	0	0	0	D.
2.8	4.8	4.0	3.9	68,790	..	.....	S.	186	122	64	61	355	85	107	99	16	150	174	41	0	81	17	138	14	37	0	Y.

DES MOINES, IOWA.

[H=866. T=74. h=64.]

3.4	4.9	3.6	4.0	5,881	26	NW.	NW.	14	10	3	4	14	9	11	27	1	14	11	6	0	9	21	31	0	1	0	J.
5.5	6.3	5.6	5.8	5,448	27	NW.	NW.	17	13	2	12	5	11	4	18	2	9	8	11	0	14	13	28	0	0	0	F.
5.0	4.6	2.8	4.1	6,158	38	NW.	N.	29	14	6	12	8	9	6	9	0	14	11	6	0	6	5	22	0	2	0	M.
5.0	5.3	3.4	4.6	6,177	32	NW	SW.	6	5	4	13	15	20	12	11	4	11	11	8	0	7	0	6	0	3	0	A.
3.3	3.7	2.6	3.2	5,293	27	W.	S.	12	2	8	13	18	10	12	18	5	16	12	3	0	7	0	0	3	6	0	M.
3.8	4.7	3.5	4.0	4,106	24	W.	SE.	5	3	9	24	21	8	4	10	6	14	10	6	0	7	0	0	2	5	0	J.
2.7	4.1	3.2	3.3	3,264	29	NE.	S.	11	10	3	7	16	12	10	3	21	14	16	1	0	9	0	0	15	7	0	J.
4.8	5.4	4.0	4.7	3,548	24	S.	S.	14	3	7	11	16	5	1	10	26	11	13	7	0	9	0	0	9	7	0	A.
5.4	4.9	4.7	5.0	3,614	34	SW.	S.	16	5	4	8	17	6	4	5	25	9	13	8	0	11	0	0	2	5	0	S.
4.1	3.7	2.7	3.5	5,335	27	SW.	NW.	11	4	2	7	20	8	11	22	8	14	13	4	0	7	0	7	0	0	0	O.
3.1	4.7	4.0	3.9	5,615	40	NW.	SW., NW.	11	7	12	7	11	13	11	13	5	15	8	7	0	5	5	18	0	0	0	N.
6.4	6.2	5.1	5.9	6,056	32	NW.	NW.	9	8	3	15	15	7	15	20	1	7	13	11	0	11	11	29	0	0	0	D.
4.4	4.9	3.8	4.4	60,495	..	.....	S.	155	84	63	133	176	118	101	161	104	148	139	78	0	102	55	141	31	36	0	Y.

DETROIT, MICH.

[H=662. T=84. h=71.]

6.9	6.5	5.6	6.7	8,308	32	SW.	W.	15	3	5	6	1	25	27	11	0	5	12	14	0	17	12	28	0	0	0	J.
6.6	8.7	6.8	7.4	6,607	36	W.	NW.	11	7	11	10	8	9	12	13	3	2	14	12	0	21	13	23	0	0	0	F.
5.0	6.5	5.4	5.6	6,506	27	E.	N.	30	14	13	11	4	6	7	8	0	7	12	12	0	10	7	27	0	0	0	M.
6.5	6.5	4.0	5.7	6,888	33	W.	W.	12	7	15	12	9	10	18	6	1	4	19	7	0	10	0	6	0	2	0	A.
5.1	4.8	2.6	4.2	4,962	35	SW.	E.	6	12	20	9	9	13	12	5	7	14	11	6	0	10	0	0	0	2	0	M.
4.8	5.5	3.8	4.7	4,198	26	SW.	W.	3	9	15	14	2	6	19	8	9	11	13	6	0	11	0	0	0	4	0	J.
2.7	5.1	2.8	3.5	5,963	26	SW.	SW.	8	19	9	12	3	23	10	8	1	13	15	3	0	6	0	0	5	3	0	J.
3.8	6.1	3.2	4.4	4,891	19	N.	E.	13	13	22	14	5	12	8	6	0	12	12	7	0	7	0	0	2	1	0	A.
5.0	6.2	5.4	5.3	5,800	30	NW.	NE.	4	19	17	18	1	8	10	12	1	9	8	13	0	8	0	0	1	1	0	S.
7.5	6.6	5.9	6.7	7,216	46	W.	SW.	17	7	6	2	2	26	14	25	0	5	12	14	0	8	0	5	0	0	0	O.
6.4	6.5	5.0	6.0	7,844	32	SW.	SW.	16	9	8	4	4	23	15	11	0	6	14	10	0	10	5	14	0	0	0	N.
7.5	8.7	7.4	7.9	7,778	30	SW., NW.	W.	9	3	8	8	7	19	26	13	0	1	11	19	0	15	10	23	0	0	0	D.
5.6	6.5	4.9	5.7	76,961	..	.....	SW.	144	122	143	120	61	180	177	128	22	89	153	123	0	133	47	120	8	13	0	Y.

Monthly and yearly meteorological summaries—Continued.

DODGE CITY, KANS.

[Latitude, 37° 45′ N.; longitude, 100° 00′ W.]

Months and year.	Pressure.			Temperature.								Dew point.				Relative humidity.				Precipitation.	
	Mean.	Maximum.	Minimum.	7 a. m.	3 p. m.	10 p. m.	Mean.	Maximum.	Minimum.	Mean. Maximum.	Mean. Minimum.	7 a. m.	3 p. m.	10 p. m.	Mean.	7 a. m.	3 p. m.	10 p. m.	Mean.	Total.	Max. 24 hours.
	In.	In.	In.	°	°	°	°	°	°	°	°	°	°	°	°					In.	In.
J	27.336	27.90	26.86	17.1	37.6	26.5	27.1	73	-17	41.2	13.8	12	18	14	15	82	48	61	64	0.07	0.03
F	27.423	27.88	26.65	22.5	38.3	30.8	30.5	75	-8	43.8	18.7	18	17	20	18	83	48	67	66	0.53	0.22
M	27.442	27.92	27.06	31.8	57.8	44.2	44.6	80	17	61.8	30.9	24	21	24	23	73	30	48	50	0.17	0.09
A	27.339	27.80	26.88	43.7	65.1	54.4	54.4	91	24	68.1	41.6	36	31	36	34	76	36	54	55	2.46	0.96
M	27.372	27.72	26.84	55.7	77.0	63.6	65.4	95	35	78.9	53.0	48	48	51	49	77	40	66	61	3.69	1.08
J	27.348	27.66	37.16	65.0	84.0	72.9	74.0	102	55	86.1	63.0	60	59	60	59	83	45	65	64	4.00	3.20
J	27.422	27.63	27.28	68.0	90.0	78.1	78.7	99	58	92.8	65.5	61	57	58	59	79	34	52	55	1.00	0.29
A	27.386	27.61	27.17	65.9	84.3	74.3	74.8	102	51	87.2	63.9	60	58	60	60	84	46	64	63	2.28	0.63
S	27.445	27.72	27.11	59.7	77.8	67.1	68.2	96	38	80.6	57.5	55	54	56	55	86	47	69	67	0.14	0.08
O	27.475	27.87	26.94	43.1	65.8	52.3	53.7	92	22	68.3	40.5	37	36	36	36	81	36	57	5[illegible]	0.48	0.32
N	27.461	27.82	27.00	31.5	54.8	41.3	42.5	80	-13	57.3	28.3	22	33	22	22	69	38	51	53	0.35	0.24
D	27.394	27.82	26.76	21.4	38.7	26.7	28.9	60	-9	42.0	16.7	17	21	19	19	84	55	75	71	0.54	0.26
Y	27.404	27.92	26.65	43.8	64.3	52.7	53.6	102	-17	67.3	41.1	36	37	38	37	80	42	61	61	15.71	...

DUBUQUE, IOWA.

[Latitude, 42° 30′ N.; longitude, 90° 44′ W.]

J	29.263	29.82	28.60	5.0	15.8	10.9	10.6	42	-32	20.9	0.4	-3	6	4	2	69	66	73	69	3.33	1.72
F	29.414	30.14	28.47	15.2	25.4	21.5	20.7	51	-12	30.0	11.0	9	18	16	14	74	75	79	76	3.56	1.21
M	29.372	29.91	28.69	25.9	38.8	32.4	32.4	70	2	41.1	24.2	20	30	26	25	78	70	77	75	1.80	1.02
A	29.216	29.65	28.52	43.0	59.6	49.5	50.7	82	16	62.0	39.0	34	41	39	38	70	52	69	64	1.37	0.51
M	29.261	29.61	28.76	59.7	74.5	65.3	66.5	90	41	77.4	55.0	51	54	55	53	72	51	70	64	2.53	0.66
J	29.266	29.59	29.04	65.3	80.8	71.1	72.4	96	45	82.8	61.6	58	59	61	60	79	50	71	66	1.32	0.48
J	29.267	29.45	29.03	72.0	86.5	76.0	78.2	101	55	88.3	67.2	64	62	64	64	78	46	68	64	2.44	0.92
A	29.299	29.48	29.08	62.8	80.5	69.7	71.0	99	44	81.6	60.3	58	58	60	59	85	49	73	69	4.40	1.77
S	29.362	29.72	28.97	55.6	68.3	61.6	61.8	88	38	71.5	53.5	53	53	54	54	88	62	77	76	7.62	1.76
O	29.342	29.86	28.80	39.4	53.8	45.8	46.3	85	15	56.5	37.1	34	38	38	36	82	56	71	71	2.22	0.80
N	29.348	29.99	28.63	28.4	42.6	34.1	35.0	72	-12	44.8	25.9	24	29	28	27	84	6[illegible]	79	74	0.74	0.32
D	29.311	30.01	28.56	19.3	26.9	22.5	22.9	50	-16	30.7	14.8	15	21	18	18	83	78	83	81	3.07	1.14
Y	29.310	30.14	28.47	41.0	54.5	46.7	47.4	101	-32	57.3	37.5	35	39	39	38	78	60	74	71	34.40	...

DULUTH, MINN.

[Latitude, 46° 48′ N.; longitude, 92° 6′ W.]

J	29.228	29.83	28.48	-3.3	6.5	2.7	2.0	34	-28	12.2	-8.6	-9	1	-1	-3	76	78	84	80	1.62	0.68
F	29.398	30.18	28.73	3.6	14.3	11.1	9.7	44	-23	20.3	0.3	0	8	7	5	86	77	83	82	0.81	0.23
M	29.378	30.05	28.82	14.2	26.3	22.7	21.1	53	-13	32.7	12.0	11	16	14	14	88	65	69	74	0.55	0.42
A	29.183	29.65	28.71	31.8	41.5	36.7	36.7	80	7	46.7	27.5	27	29	28	28	83	67	73	74	1.58	0.47
M	29.210	29.65	28.60	45.3	52.3	49.3	49.0	80	35	58.7	41.6	40	38	40	40	84	64	74	74	4.93	3.27
J	29.230	29.58	28.92	51.7	59.4	55.2	55.4	83	36	65.1	47.9	48	49	50	49	86	72	82	80	2.71	1.61
J	29.218	29.47	28.89	61.9	71.6	66.4	66.6	95	52	76.9	58.4	57	58	58	58	85	67	77	76	4.17	1.34
A	29.273	29.48	29.02	58.1	67.5	61.5	62.4	94	46	72.4	51.5	53	55	55	54	84	67	79	77	1.53	0.50
S	29.333	29.69	28.82	50.5	60.8	55.0	55.4	86	36	63.4	48.7	45	48	47	47	81	66	75	74	2.68	0.80
O	29.255	29.83	28.65	36.5	46.0	40.5	41.0	65	8	49.7	32.8	30	32	32	32	79	62	72	71	3.34	1.57
N	29.286	30.07	28.52	26.3	34.4	29.9	30.2	65	-15	38.4	22.5	21	25	22	23	81	69	75	75	1.99	0.45
D	29.293	29.97	28.71	14.2	21.4	18.1	17.9	44	-17	26.8	9.8	9	15	13	12	81	77	80	80	2.65	0.80
Y	29.274	30.18	28.48	32.6	41.8	37.4	37.3	95	-28	46.9	28.9	28	31	30	30	83	69	77	76	28.56	.....

EASTPORT, ME.

[Latitude, 44° 54′ N.; longitude, 66° 59′ W.]

J	29.889	30.62	28.90	18.7	22.6	20.1	20.5	50	-13	31.1	9.9	14	16	15	15	82	77	81	80	7.78	1.97
F	30.052	30.82	28.94	18.5	23.2	20.2	20.6	47	-4	29.6	11.8	12	14	14	13	77	69	76	74	3.74	0.62
M	29.719	30.78	28.80	25.3	31.6	28.5	28.5	45	-2	35.2	21.1	18	22	21	20	76	70	73	73	4.46	1.88
A	29.845	30.54	29.12	35.1	41.0	36.4	37.5	66	20	44.5	30.3	27	30	29	29	73	68	75	72	2.92	0.73
M	29.993	30.38	29.52	46.6	51.9	45.8	48.1	74	36	55.3	41.0	41	44	41	42	81	76	85	81	2.57	1.44
J	29.952	30.36	29.49	53.7	57.7	51.5	54.3	74	42	61.9	46.4	48	49	47	48	81	74	86	80	6.01	3.08
J	29.893	30.14	29.56	59.2	65.2	58.2	60.9	84	49	68.7	53.1	56	59	56	57	89	83	92	88	4.51	1.91
A	29.881	30.31	29.52	57.4	63.9	58.5	59.9	78	49	67.4	52.5	52	54	54	53	84	73	84	80	3.56	1.37
S	29.951	30.34	29.43	52.2	59.0	52.6	54.6	72	37	61.5	47.6	48	49	47	48	84	70	83	79	1.05	0.30
O	29.892	30.49	29.17	44.2	49.8	45.3	46.4	64	26	52.3	40.4	38	39	38	38	79	69	77	75	2.45	1.58
N	29.908	30.74	29.07	36.7	40.0	36.1	37.6	57	4	44.6	30.5	29	30	28	29	75	70	74	73	2.32	0.64
D	29.960	30.88	29.08	23.2	28.1	25.1	25.5	50	-10	32.1	18.4	17	20	19	19	78	74	77	76	5.59	1.81
Y	29.911	30.86	28.80	39.2	44.5	39.9	41.2	84	-13	48.7	33.6	33	36	34	34	80	73	80	78	48.96	.....

Monthly and yearly meteorological summaries—Continued.

DODGE CITY, KANS.

[H=2,523. T=44. h=37.]

Cloudiness (in tenths.)				Wind.													Number of days—										
7 a. m.	3 p. m.	10 p. m.	Mean.	Total (miles).	Maximum.	Direction.	Prevailing direction.	North.	Northeast.	East.	Southeast.	South.	Southwest.	West.	Northwest.	Calms.	Clear.	Fair.	Cloudy.	Foggy.	Rain or snow.	Max. below 32°.	Min. below 32°.	Max. above 90°.	Thunder-storms.	Auroras.	Months and year.
1.5	4.1	2.2	2.6	7,030	37	NW.	SE., S.	12	11	4	17	17	12	6	13	1	18	13	0	0	4	9	30	0	0	0	J.
5.3	5.0	3.7	4.7	7,804	52	NW.	SE.	6	23	6	28	6	4	2	8	1	9	11	8	0	5	7	24	0	0	0	F.
2.0	2.6	1.5	2.0	7,648	38	N.	N.	26	20	7	14	12	6	2	5	1	20	8	3	0	3	2	18	0	0	0	M
2.1	3.9	2.2	2.1	8,576	52	NW.	SE.	5	18	8	27	12	5	7	11	2	18	7	5	0	9	0	3	2	0	0	A.
2.0	3.0	3.4	3.1	7,676	48	S.	SE.	9	23	10	35	7	0	2	7	0	13	12	4	0	11	0	0	2	5	0	M.
4.1	3.7	4.4	4.1	7,648	28	S., SE.	SE.	3	17	22	44	4	0	0	0	0	12	12	6	0	10	0	0	8	1	0	J.
2.1	1.7	3.4	2.7	6,836	48	NE.	SE.	3	25	12	26	23	2	2	0	0	20	10	1	0	10	0	0	23	4	0	J.
5.1	4.5	3.8	4.5	7,581	34	NE.	S.	1	19	10	29	31	2	0	0	1	10	17	4	0	9	0	0	14	1	0	A.
2.9	4.3	2.5	3.2	7,825	48	SW.	SE.	6	25	4	35	17	2	0	0	1	17	10	3	0	3	0	0	5	0	0	S.
2.4	2.4	1.4	2.1	6,521	36	S.	NE.	5	33	1	16	21	10	1	4	2	22	7	2	0	4	0	5	2	0	0	O.
2.2	2.4	1.8	2.1	6,046	36	N.	NE.	8	30	3	10	23	13	1	2	0	20	8	2	0	2	4	16	0	0	0	N.
3.4	2.0	2.0	2.5	7,293	36	N.	NE.	14	35	1	11	11	13	2	6	0	20	8	3	0	5	7	30	0	1	0	D.
2.2	3.3	2.7	3.1	88,424	...	.....	SE.	98	274	88	292	184	69	25	56	9	201	123	41	0	78	29	126	56	12	0	Y.

DUBUQUE, IOWA.

[H=665. T=53. h=47.]

4.1	4.4	4.5	4.4	3,093	18	W.	NW.	14	4	3	4	14	6	18	20	10	10	15	6	0	10	21	30	0	1	0	J.
5.6	6.2	4.7	5.5	2,931	25	NW. W.	W.	6	8	6	6	10	4	18	10	16	8	9	11	0	11	14	28	0	1	0	F.
5.0	5.4	2.7	4.4	3,277	20	NW.	SE, NW	14	14	2	17	9	1	4	17	15	10	18	3	0	7	7	28	0	0	0	M.
4.6	5.3	2.9	4.3	3,977	25	W.	S.	6	5	6	15	17	9	9	14	9	11	16	3	0	7	0	6	0	1	0	A.
2.5	4.9	3.1	3.5	3,541	24	S.	SE.	6	5	7	22	17	7	11	8	10	16	11	4	0	12	0	0	0	4	0	M.
3.8	5.7	3.8	4.4	2,383	22	NW.	SE.	1	5	5	13	6	10	5	10	35	11	12	7	0	6	0	0	4	2	0	J.
3.8	4.3	2.8	3.6	2,790	18	W.	S.	15	8	2	7	16	12	6	11	16	14	13	4	0	8	0	0	14	5	0	J.
5.2	5.1	4.2	4.9	2,807	24	SW.	SE.	11	3	9	20	16	3	2	13	16	8	16	7	0	14	0	0	7	3	0	A.
5.5	5.8	4.6	5.3	3,211	20	NE.	SE.	12	6	7	17	13	4	7	10	14	11	8	11	0	13	0	0	0	0	0	S.
3.8	4.5	3.2	3.8	3,971	25	SW.	NW.	3	1	4	5	21	6	21	23	9	14	12	5	0	6	0	13	0	2	0	O.
4.2	4.5	4.1	4.3	3,450	25	NW.	W.	12	8	8	2	13	4	16	15	12	14	7	9	0	5	5	17	0	0	0	N.
7.2	7.5	5.3	6.7	2,897	20	SE., W., N., SW.	S.	9	1	2	13	17	8	11	15	17	6	10	15	0	11	13	28	0	0	0	D.
4.6	5.3	3.9	4.6	38,328	...	.....	S.	109	68	61	141	169	74	128	166	179	133	147	85	0	110	60	150	25	19	0	Y.

DULUTH, MINN.

[H=672. T=61. h=56.]

2.6	6.3	4.1	4.6	4,770	32	NW.	SW.	5	16	4	11	7	22	7	19	2	11	13	7	0	11	30	31	0	0	1	J.
5.2	6.1	4.4	5.2	4,843	38	NE.	NE.	3	25	4	4	7	16	7	15	3	7	13	8	0	12	24	28	0	0	1	F.
4.7	5.5	3.0	4.4	4,219	29	NE.	NE.	2	40	2	2	2	4	10	27	4	14	9	8	0	4	13	31	0	0	0	M.
5.1	6.2	4.2	5.2	5,516	35	NE.	NE.	6	42	0	2	2	11	8	16	3	10	12	8	0	13	1	21	0	2	2	A.
2.0	4.0	2.3	3.1	4,426	28	NW.	NE.	5	52	3	3	2	10	7	8	3	18	10	3	2	9	0	0	0	3	2	M.
3.2	5.0	2.6	3.6	3,801	26	NE.	NE.	4	60	1	2	0	8	4	9	2	14	11	5	0	9	0	0	0	2	1	J.
4.7	6.1	4.0	4.9	4,628	24	NE.	NE.	3	36	3	9	3	10	7	21	1	12	11	8	0	14	0	0	2	6	0	J.
5.5	5.9	3.4	4.9	4,826	31	NE.	NE.	5	36	7	10	0	5	7	22	1	8	18	5	0	13	0	0	1	3	1	A.
5.4	4.8	3.3	4.5	5,111	35	SW.	NE.	4	34	5	9	5	10	6	15	2	9	16	5	0	10	0	0	0	1	4	S.
5.5	5.8	4.6	5.3	5,906	40	NW.	NW.	3	17	2	3	4	23	15	25	1	7	15	9	0	8	2	11	0	1	1	O.
5.7	6.5	5.4	5.9	5,071	39	NW.	NW.	4	14	3	13	8	18	8	19	2	9	10	10	0	12	9	19	0	0	0	N.
6.1	7.6	5.2	6.3	6,194	35	NE.	NW.	3	11	8	5	5	25	6	30	0	7	9	15	2	18	20	30	0	0	1	D.
4.8	5.8	3.9	4.8	59,311	...	.....	NE.	47	383	42	73	45	162	92	226	24	126	147	91		133	99	171	3	18	14	Y.

EASTPORT, ME.

[H=53. T=51. h=43.]

6.1	6.4	6.3	6.3	8,514	55	NE.	NW.	17	11	1	8	7	12	2	35	0	5	14	12	0	21	12	29	0	0	0	J.
5.3	5.8	4.8	5.2	8,614	47	SE.	NW.	11	7	3	7	7	8	4	36	1	9	8	11	0	15	15	28	0	0	4	F.
6.7	6.6	5.3	6.2	10,275	50	E.	N.	23	18	6	4	4	7	9	22	0	8	9	14	0	17	8	27	0	0	1	M.
5.0	5.3	4.4	4.9	9,242	50	NE.	N.	25	11	11	5	5	11	5	17	0	12	9	9	0	12	1	15	0	0	2	A.
5.3	4.5	3.9	4.6	6,159	28	NW.	S.	18	15	5	4	32	11	2	4	2	12	13	6	1	10	0	0	0	0	2	M.
4.9	4.6	2.3	3.9	5,693	30	NE.	S.	8	12	5	7	33	17	2	4	2	7	22	1	0	9	0	0	0	4	0	J.
3.6	5.2	2.5	3.8	5,317	31	E.	S.	12	3	6	3	30	26	5	1	7	13	16	2	2	13	0	0	0	2	3	J.
4.1	4.5	3.4	4.0	5,440	52	E.	S.	11	8	6	3	25	10	7	16	7	14	13	4	0	11	0	0	0	3	3	A.
4.1	3.9	2.9	3.6	5,324	27	NE.	SW.	15	7	2	0	14	23	10	11	8	14	14	2	0	9	0	0	0	2	1	S.
6.3	4.6	3.7	4.9	6,273	37	SE.	NW., SW.	12	6	4	6	9	19	12	19	6	7	19	5	0	9	0	5	0	0	1	O.
6.3	5.6	4.5	5.5	7,984	51	E.	NW.	11	5	3	10	6	17	9	26	3	8	11	11	1	11	1	13	0	0	2	N.
5.5	5.3	4.5	5.1	8,978	54	SE.	NW.	19	7	4	4	7	9	4	38	1	13	7	11	0	13	13	25	0	0	2	D.
5.3	5.2	4.0	4.8	87,813	...	.....	NW.	182	110	56	61	179	170	71	229	37	122	155	88	4	150	50	142	0	11	21	Y.

Monthly and yearly meteorological summaries—Continued.

EL PASO, TEX.

[Latitude, 31° 47′ N.; longitude, 106° 30′ W.]

Months and year.	Pressure. Mean.	Pressure. Maximum.	Pressure. Minimum.	Temperature. 7 a. m.	Temperature. 3 p. m.	Temperature. 10 p. m.	Temperature. Mean.	Temperature. Maximum.	Temperature. Minimum.	Temperature. Mean. Maximum.	Temperature. Mean. Minimum.	Dew point. 7 a. m.	Dew point. 3 p. m.	Dew point. 10 p. m.	Dew point. Mean.	Relative humidity. 7 a. m.	Relative humidity. 3 p. m.	Relative humidity. 10 p. m.	Relative humidity. Mean.	Precipitation. Total.	Precipitation. Max. 24 hours.
	In.	In.	In.	°	°	°	°	°	°	°	°	°	°	°	°					In.	In.
J ..	26.286	26.68	26.05	35.1	54.5	48.5	46.0	70	18	60.1	31.6	20	23	24	22	55	31	39	42	0.03	0.03
F ..	26.285	26.66	25.99	39.4	58.4	52.8	50.2	72	21	63.6	35.7	26	33	31	30	60	40	46	49	0.15	0.10
M .	26.285	26.51	26.04	45.4	69.6	62.4	59.1	87	29	75.0	42.2	28	38	34	33	51	34	37	41	0.32	0.32
A ..	26.186	26.47	25.99	48.6	74.0	66.4	63.0	90	35	78.5	46.3	26	28	29	28	44	19	26	30	0.09	0.09
M .	26.211	26.47	26.03	58.4	82.2	74.8	71.8	97	41	86.2	57.0	36	37	39	38	46	22	30	32	0.13	0.09
J ..	26.160	26.35	26.04	68.2	90.6	80.8	79.9	101	52	94.7	66.5	52	54	54	53	59	29	41	43	0.34	0.21
J ..	26.271	26.45	26.16	69.5	91.1	82.2	80.9	103	62	94.9	67.6	58	58	58	58	68	35	46	50	0.73	0.29
A ..	26.212	26.34	26.11	70.1	88.9	80.7	79.9	102	61	92.8	68.6	62	64	63	63	76	45	57	59	1.68	0.44
S ..	26.275	26.38	26.13	65.5	82.8	74.5	74.3	92	52	86.6	64.1	60	64	62	62	83	54	66	68	0.94	0.22
O ..	26.276	26.60	25.79	52.6	73.2	64.3	63.4	94	35	77.6	50.7	45	54	50	49	76	51	60	62	0.78	0.70
N ..	26.307	26.51	26.09	41.8	64.9	55.8	54.2	77	24	68.9	39.6	33	43	40	39	73	47	57	59	0.56	0.48
D ..	26.269	26.52	25.93	31.7	47.8	41.2	40.2	69	-2	52.7	28.7	25	30	29	28	76	52	63	64	1.01	0.66
Y ..	26.252	26.68	25.79	52.2	73.2	65.4	63.6	103	-24	77.6	49.9	39	44	43	42	64	38	47	50	6.76	.....

ERIE, PA.

[Latitude, 42° 7′ N.; longitude, 80° 5′ W.]

J ..	29.227	29.82	28.67	21.8	26.3	24.0	24.0	64	-4	38.1	14.5	16	20	19	18	80	77	81	79	3.66	0.62
F ..	29.401	30.10	28.56	26.4	29.9	27.4	27.9	64	8	42.1	20.0	22	24	23	23	83	80	84	82	8.50	2.02
M .	29.278	29.92	28.63	27.0	31.6	28.8	29.1	58	12	40.7	21.9	21	25	23	23	78	76	80	78	3.06	1.09
A ..	29.258	29.81	28.46	40.4	44.5	41.8	42.2	72	17	53.2	33.7	32	34	33	33	74	69	71	71	2.55	0.88
M .	29.293	29.58	28.96	58.8	64.9	59.5	61.1	86	43	69.7	51.6	50	49	50	50	72	60	71	68	2.96	1.07
J ..	29.282	29.68	28.98	65.8	70.7	65.6	67.4	85	52	75.6	58.5	58	58	57	58	76	67	76	73	5.21	3.64
J ..	29.257	29.42	28.95	73.2	79.4	74.7	75.8	92	58	84.3	67.5	63	65	63	64	72	62	69	68	0.80	0.46
A ..	29.283	29.57	29.00	65.4	72.8	67.5	68.6	94	47	77.5	59.8	55	59	57	57	70	63	69	68	3.54	1.49
S ..	29.379	29.69	28.89	56.7	64.1	59.1	60.0	92	38	69.7	51.6	50	55	52	52	79	72	78	76	3.17	1.46
O ..	29.290	29.72	28.77	46.1	52.1	48.4	48.9	79	26	58.7	41.5	40	44	42	42	79	74	78	77	4.43	0.99
N ..	29.299	30.14	28.61	37.7	41.9	39.7	39.8	70	14	51.4	32.2	31	35	32	33	78	77	74	76	4.13	0.98
D ..	29.316	30.14	28.79	30.0	34.1	32.5	32.2	58	8	41.2	25.5	25	28	27	27	82	79	82	81	3.13	0.46
Y ..	29.297	30.14	28.46	45.8	51.0	47.4	48.1	94	-4	58.5	39.9	39	41	40	40	77	71	76	75	45.14	.....

ESCANABA, MICH.

[Latitude, 45° 48′ N.; longitude, 87° 5′ W.]

J .	29.258	29.86	28.41	4.2	12.3	6.4	7.6	39	-24	16.9	-2.1	-0	6	2	2	82	74	81	79	1.15	0.50
F ..	29.453	30.18	28.55	a7.1	18.0	13.8	13.0	36	-18	21.9	2.1	a2	11	9	7	a79	74	82	78	1.41	0.43
M .	29.429	30.10	28.86	13.4	25.0	19.1	19.2	44	-12	28.7	9.4	8	16	13	12	78	68	77	74	0.31	0.14
A ..	29.257	29.80	28.48	30.1	38.6	34.5	34.4	57	8	42.2	27.4	27	32	31	30	87	78	86	84	2.65	1.16
M .	29.316	29.62	28.82	50.2	58.7	54.2	54.4	77	32	63.6	45.9	45	47	48	47	83	67	80	76	0.73	0.35
J ..	29.319	29.72	28.94	59.1	65.8	61.4	62.1	80	43	68.9	54.4	53	55	55	54	80	69	80	76	2.27	1.59
J ..	29.295	29.52	28.96	65.5	72.7	67.8	68.7	86	44	75.7	60.1	59	60	62	60	80	67	81	76	4.14	1.62
A ..	29.362	29.57	29.10	57.4	67.3	61.6	62.1	82	38	69.9	53.0	52	54	54	53	84	63	76	74	1.44	0.37
S ..	29.418	29.81	28.86	50.1	60.0	53.7	54.6	80	29	62.7	45.5	45	45	46	45	83	60	76	73	1.13	0.53
O ..	29.305	29.80	28.73	37.5	45.5	39.8	40.9	68	11	48.0	32.9	32	32	32	32	80	61	74	72	3.07	0.81
N ..	29.339	30.24	28.53	28.4	34.1	30.5	31.0	65	-7	37.1	24.6	23	23	23	23	80	67	75	74	0.98	0.30
D	29.331	29.96	28.76	23.1	26.4	24.8	24.8	42	-6	30.4	18.4	19	21	20	20	83	80	83	82	3.73	0.94
Y ..	29.340	30.24	28.41	35.5	43.7	39.0	39.4	86	-24	50.5	31.0	30	33	33	32	82	69	79	77	23.01	.....

EUREKA, CAL.

[Latitude, 40° 48′ N.; longitude, 124° 11′ W.]

J ..	30.168	30.55	29.57	43.7	50.4	46.9	47.0	59	27	52.8	40.5	41	46	44	44	92	86	90	89	8.86	2.19
F ..	29.957	30.36	29.48	36.5	45.8	41.8	41.4	62	27	48.4	33.7	33	41	37	37	87	84	84	85	9.07	2.88
M .	30.128	30.35	29.84	44.9	53.8	49.3	49.3	64	34	56.3	42.5	41	47	45	44	87	79	85	84	2.28	0.88
A ..	30.062	30.38	29.40	45.4	50.9	49.2	48.5	64	36	54.1	42.9	43	46	45	44	90	84	87	87	5.55	1.64
M .	30.031	30.39	29.77	48.1	54.8	52.9	51.9	75	35	58.2	46.3	46	48	48	47	91	78	85	85	3.51	1.05
J ..	29.948	30.16	29.72	48.8	55.5	53.7	52.7	64	40	58.0	46.9	47	50	49	49	92	82	86	87	1.92	1.55
J ..	30.033	30.20	29.87	49.6	54.6	53.3	52.5	60	43	57.0	48.0	48	51	50	50	93	88	90	90	0.06	0.02
A ..	29.939	30.06	29.78	52.5	56.2	54.7	54.5	62	48	58.6	50.8	50	52	51	51	91	84	88	87	0.07	0.03
S ..	29.968	30.12	29.73	50.1	56.7	53.3	53.4	68	42	59.3	48.6	48	51	51	50	93	83	91	89	0.21	0.20
O ..	30.063	30.23	29.85	48.4	55.9	52.7	52.3	82	40	59.1	46.8	46	50	50	49	92	84	90	89	0.55	0.34
N ..	30.045	30.26	29.76	46.1	54.7	51.1	50.6	67	34	56.8	44.2	44	50	48	47	92	85	89	88	2.66	0.91
D ..	30.113	30.40	29.35	43.9	50.4	48.2	47.5	60	35	53.8	41.6	42	46	45	44	92	86	91	89	5.43	0.88
Y ..	30.038	30.55	29.35	46.5	53.3	50.6	50.1	82	27	56.0	44.4	44	48	47	46	91	84	88	88	40.17	.....

Monthly and yearly meteorological summaries—Continued.

EL PASO, TEX.

[H=3764. T=43. h=33.]

Cloudiness (in tenths).				Wind.													Number of days—										
7 a. m.	3 p. m.	10 p. m.	Mean.	Total (miles).	Maximum.	Direction.	Prevailing direction.	North.	Northeast.	East.	Southeast.	South.	Southwest.	West.	Northwest.	Calms.	Clear.	Fair.	Cloudy.	Foggy.	Rain or snow.	Max. below 32°.	Min. below 32°.	Max. above 90°.	Thunder-storms.	Auroras.	Months and year.
1.0	1.7	1.5	1.4	4,209	24	SW.	SW.	4	9	3	0	6	38	24	2	7	24	6	1	0	1	0	17	0	0	0	J.
2.1	2.8	1.5	2.1	3,075	21	SWSE	SW.	5	11	1	7	17	18	6	4	15	21	4	3	0	2	0	9	0	0	0	F.
0.5	1.7	0.3	0.8	3,383	23	NW.	NW.	3	3	16	5	3	4	13	22	24	27	4	0	0	1	0	1	0	0	0	M.
0.7	1.3	0.5	0.8	3,716	23	SW.	SW.	2	2	3	4	10	33	8	9	19	27	3	0	0	1	0	0	0	0	0	A.
0.8	1.5	1.1	1.1	3,164	19	E.	NW.	1	3	13	10	2	6	13	18	27	27	4	0	0	3	0	0	7	1	0	M.
0.7	1.5	2.3	1.5	3,240	25	NE.	E.	0	7	30	20	5	5	3	5	15	23	7	0	0	5	0	0	26	2	0	J.
2.8	3.0	4.5	3.4	2,460	23	NW.	SE.	5	5	8	18	7	12	4	10	24	13	16	2	0	8	0	0	24	2	0	J.
4.3	3.1	5.4	4.3	2,484	25	S.	SE.	1	3	14	24	4	4	3	12	28	9	20	2	0	11	0	0	25	6	0	A.
3.5	2.7	2.2	2.8	2,404	22	SE.	E.	0	1	23	20	8	1	1	11	25	16	13	1	0	7	0	0	5	1	0	S.
1.8	1.4	0.5	1.2	2,033	17	E.	E., SE.	3	4	15	15	5	2	4	6	39	25	6	0	0	3	0	0	4	0	0	O.
1.7	2.4	1.0	1.7	1,297	20	E.	NW.	1	1	11	4	1	3	10	19	40	21	7	2	0	3	0	3	0	0	0	N.
2.4	2.3	1.4	2.0	3,379	26	E.	NW.	8	4	17	8	1	1	9	25	20	22	5	4	0	7	3	18	0	0	0	D.
1.9	2.1	1.8	1.9	34,844	..	.....	E.	38	53	154	135	69	127	96	143	283	255	95	15	0	52	3	48	91	12	0	Y.

ERIE, PA.

[H=681. T=64. h=49.]

8.4	8.5	6.8	7.9	10,045	36	W.	SW.	4	6	4	1	16	26	18	18	0	1	10	20	0	24	12	29	0	0	0	J.
8.0	7.9	7.6	7.8	8,399	44	S.	NW.	4	14	8	1	11	7	16	18	5	2	7	19	0	25	7	27	0	3	0	F.
5.6	6.1	5.0	5.6	8,569	35	S.	NW.	10	13	5	3	12	7	8	34	1	8	10	13	0	18	7	27	0	0	0	M.
5.3	5.1	5.1	5.2	8,535	38	S.	W.	4	16	9	3	13	13	18	14	0	8	18	4	0	13	0	12	0	1	1	A.
3.6	4.4	3.9	4.0	5,699	30	S.	NE.	2	25	13	2	19	12	9	10	1	13	11	7	0	14	0	0	0	7	0	M.
5.0	5.5	4.0	4.8	4,804	22	SW.	NE.	4	21	8	4	18	14	12	8	1	10	12	8	0	10	0	0	0	6	1	J.
4.4	4.3	4.8	4.5	5,826	30	NW.	S.	2	16	11	3	26	8	13	14	0	7	20	4	0	6	0	0	5	6	0	J.
4.1	3.8	4.1	4.0	5,021	24	NW.	S.	15	17	5	3	27	7	6	13	0	10	17	4	0	12	0	0	3	4	0	A.
6.4	5.5	5.6	5.8	5,701	29	W.	S.	10	13	7	5	22	11	9	12	1	6	12	12	0	14	0	0	1	1	0	S.
6.4	6.3	5.9	6.2	8,365	48	W.	NW.	13	8	2	1	20	17	8	24	0	3	18	10	0	17	0	6	0	2	0	O.
6.5	6.2	5.6	6.1	8,565	36	NW.	SW.	7	7	7	2	16	25	11	15	0	8	12	10	0	14	0	9	0	0	0	N.
3.2	3.0	7.6	7.9	8,262	43	W.	S.	3	5	3	2	28	22	16	14	0	3	6	22	0	22	5	25	0	0	0	D.
6.0	6.0	5.5	5.8	87,791	..	.....	S.	78	161	82	30	228	169	144	194	9	79	153	133	0	189	31	135	9	30	2	Y.

ESCANABA, MICH.

[H=608. T=49. h=34.]

5.4	5.7	4.8	5.3	6,358	31	N.	N.	25	12	1	2	6	19	5	19	4	7	15	9	0	12	30	0	31	0	2	J.
6.1	6.8	5.6	6.2	5,628	32	N.	N.	18	17	5	5	14	8	2	10	4	5	12	10	0	10	22	0	28	0	6	F.
4.9	4.1	3.5	4.2	6,864	36	N.	N.	32	22	1	5	9	12	1	6	5	11	15	5	0	7	21	0	31	0	2	M.
6.9	5.9	4.8	5.9	6,082	27	WNW	S.	17	18	4	4	20	14	1	5	7	6	12	12	0	12	0	0	22	1	3	A.
3.8	3.3	3.2	3.3	5,198	29	SW.	S.	8	17	4	6	33	11	2	0	12	16	10	5	0	6	0	0	0	2	0	M.
5.2	5.5	4.9	5.2	5,099	22	N.	S.	6	19	4	1	32	17	4	3	4	9	11	10	0	11	0	0	0	4	2	J.
4.6	5.0	3.8	4.5	5,408	25	NW.	SW.	18	12	2	4	19	25	2	7	4	11	15	5	0	11	0	0	0	5	2	J.
5.1	5.0	3.8	4.5	5,511	26	NE.	N.	24	14	0	4	22	19	3	5	2	10	13	8	0	10	0	0	0	5	0	A.
4.4	4.8	3.0	4.1	5,829	30	W. N.	N.	28	7	2	7	17	17	5	5	2	13	12	5	1	6	0	0	0	0	2	S.
6.1	6.8	6.1	6.3	7,700	37	W.	SW.	19	4	1	6	5	28	7	22	1	6	11	14	1	12	1	0	14	0	0	O.
7.0	7.3	5.1	6.5	6,501	36	N.	N.	30	12	2	1	7	16	6	14	2	6	12	12	0	8	7	0	22	0	0	N.
3.2	3.0	7.9	8.0	6,695	30	NW.	SW.	18	17	6	6	3	24	6	10	3	1	9	21	0	19	16	0	31	0	0	D.
5.6	5.7	4.6	5.3	72,783	..	.....	N.	243	171	32	51	187	210	44	106	50	101	147	116	2	124	97	0	179	17	19	Y.

EUREKA, CAL.

[H=50. T=60. h=52.]

6.4	6.5	6.5	6.5	11,219	..	.....	N.	28	6	4	14	13	3	3	5	17	5	14	12	0	19	0	4	0	0	0	J.
6.4	7.6	7.0	7.0	2,207	..	.....	S.	18	6	3	14	21	1	5	7	9	5	6	17	0	19	0	9	0	0	0	F.
6.1	7.1	6.6	6.6	3,588	24	SW.	NW.	19	4	7	10	3	14	9	21	6	4	14	13	0	11	0	0	0	0	0	M.
6.8	6.4	5.7	6.3	7,021	40	NW.	NW.	24	1	6	7	7	11	2	28	4	4	15	11	0	13	0	0	0	0	0	A.
7.3	6.6	6.3	6.7	5,449	29	N.	N.	26	4	1	13	2	10	11	23	3	4	12	15	0	9	0	0	0	2	0	M.
5.3	4.2	4.1	4.5	5,150	28	NW.	NW.	21	0	3	7	10	4	7	36	2	9	14	7	0	3	0	0	0	0	0	J.
4.5	6.4	3.9	4.9	4,154	29	N.	NW.	15	0	1	5	8	3	13	47	1	6	22	3	2	0	0	0	0	0	0	J.
6.3	5.3	4.7	5.4	4,046	25	NW.	NW.	25	4	1	0	5	5	7	42	4	6	19	6	0	0	0	0	0	0	0	A.
3.5	3.1	4.0	3.5	3,960	42	N.	NW.	20	7	3	4	4	8	10	24	10	13	14	3	2	1	0	0	0	0	0	S.
3.7	1.8	3.7	3.1	3,328	30	N.	N.	30	10	1	8	9	5	6	19	5	15	15	1	3	3	0	0	0	0	0	O.
6.3	4.9	6.6	5.9	No record.			SE.	18	7	4	22	8	9	3	13	6	5	14	11	0	7	0	0	0	0	0	N.
7.7	6.2	6.9	6.9	No record.			SE	13	6	5	28	16	8	3	9	5	2	11	18	0	18	0	0	0	1	0	D.
5.9	5.5	5.5	5.6	.....	..	.....	NW.	257	55	39	132	106	81	79	274	72	78	170	117	7	103	0	13	0	3	0	Y.

Monthly and yearly meteorological summaries—Continued.

FORT APACHE, ARIZ.

[Latitude, 33° 48′ N.; longitude, 109° 57′ W.]

Months and year.	Pressure.			Temperature.								Dew point.				Relative humidity.				Precipitation.	
	Mean.	Maximum.	Minimum.	7 a. m.	3 p. m.	10 p. m.	Mean.	Maximum.	Minimum.	Mean. Maximum.	Mean. Minimum.	7 a. m.	3 p. m.	10 p. m.	Mean.	7 a. m.	3 p. m.	10 p. m.	Mean.	Total.	Max. 24 hours.
	In.	In.	In.	°	°	°	°	°	°	°	°	°	°	°	°					In.	In.
J..	25.043	25.30	24.76	22.2	51.4	36.8	36.8	65	10	56.1	19.4	13	16	18	16	69	26	47	47	0.59	0.59
F..	25.007	25.42	24.75	30.7	51.7	41.2	41.2	72	13	55.4	27.0	24	24	26	24	77	39	56	57	2.16	1.49
M.	25.084	25.30	24.85	31.6	66.4	50.6	49.5	79	22	69.8	29.0	20	20	19	20	61	18	30	36	0.04	0.04
A..	24.990	25.21	24.76	36.0	65.7	53.6	51.8	82	27	69.6	34.2	25	22	27	24	65	23	40	42	0.81	0.54
M.	25.016	25.24	24.83	43.7	76.2	64.9	61.6	92	32	80.5	41.8	26	26	28	27	50	17	27	32	0.15	0.12
J..	24.982	25.13	24.88	52.7	87.5	75.4	71.9	102	39	92.0	50.8	35	39	41	38	52	20	32	35	1.70	1.10
J..	25.115	25.24	25.01	59.3	84.9	74.6	72.9	99	51	89.8	57.6	52	58	58	56	79	44	60	61	3.29	1.01
A..	25.050	25.17	24.95	59.5	82.1	71.9	71.2	98	50	87.3	57.8	53	59	57	57	80	48	67	64	3.92	0.72
S..	25.085	25.18	24.93	55.8	77.3	67.4	66.8	92	44	81.1	53.8	51	58	56	55	84	53	69	69	2.28	0.77
O..	25.058	25.34	24.48	41.0	69.8	55.3	55.4	88	28	73.1	37.9	35	45	40	40	79	42	58	60	0.55	0.47
N..	25.088	25.22	24.80	32.1	61.2	44.9	46.1	74	20	64.2	29.6	26	37	31	31	78	44	60	66	1.83	0.62
D..	25.015	25.22	24.76	23.8	44.8	31.7	33.4	57	1	48.9	21.2	19	27	24	23	84	52	73	69	0.57	0.25
Y..	25.045	25.42	24.48	40.7	68.2	55.7	54.9	102	1	72.3	38.3	32	36	36	34	72	36	52	53	17.84	.....

FORT ASSINNIBOINE, MONT.

[Latitude, 48° 32′ N.; longitude, 109° 42′ W.]

J..	26.978	27.61	26.39	8.4	10.8	8.8	9.3	43	-35	20.4	-5.9	-1	1	-1	-0	64	64	63	64	1.17	0.39
F..	27.186	27.73	26.65	-6.7	0.6	-1.6	-2.6	46	-56	6.4	-16.5	-17	-10	-11	-13	59	60	62	60	0.05	0.05
M.	27.153	27.69	26.53	28.2	38.1	34.6	33.6	60	-15	45.3	22.2	16	23	21	20	59	55	56	57	0.07	0.07
A..	27.074	27.45	26.72	38.6	51.5	46.2	45.4	79	21	56.4	33.8	24	26	28	26	56	40	51	49	1.64	0.69
M.	27.115	27.02	26.70	46.3	63.3	59.7	56.4	92	29	70.2	41.3	28	30	33	30	51	32	40	41	0.72	0.54
J..	27.096	27.47	26.78	53.2	65.0	62.7	60.3	87	37	71.8	47.8	42	47	49	46	67	54	63	61	9.23	3.71
J..	27.202	27.41	26.95	57.4	75.4	71.7	68.2	93	43	81.7	53.1	46	48	52	49	67	40	52	53	1.16	0.56
A..	27.164	27.48	26.85	52.5	70.1	65.4	62.7	89	42	76.0	49.8	46	47	49	47	79	48	57	61	2.56	1.68
S..	27.166	27.50	26.81	47.2	65.5	55.9	56.2	84	33	69.7	45.0	40	41	43	41	78	43	63	61	1.14	0.94
O..	27.230	27.64	26.77	36.1	51.4	42.5	43.3	77	-3	55.7	31.7	28	29	29	29	74	47	63	61	0.18	0.07
N..	27.174	27.64	26.79	24.4	35.5	26.7	28.9	71	-30	40.1	17.6	13	15	13	14	66	48	60	58	0.29	0.21
D..	27.139	27.77	26.80	10.9	15.9	13.2	13.3	52	-30	22.0	3.8	2	4	4	4	70	61	66	66	0.63	0.42
Y..	27.140	27.77	26.39	33.0	45.3	40.5	39.6	93	-55	51.3	27.0	22	25	26	24	66	49	58	58	18.94	.....

FORT BIDWELL, CAL.

[Latitude, 41° 53′ N.; longitude, 120° 11′ W.]

J..	25.413	25.69	24.80	31.1	35.4	33.9	33.5	52	6	41.3	22.5	29	29	28	29	92	78	80	83	3.31	0.84
F..	25.219	25.75	24.75	20.6	28.0	24.9	24.5	44	-2	33.5	14.2	20	24	22	22	96	85	86	89	4.85	0.94
M.	25.468	25.74	25.20	36.7	49.4	44.6	43.6	67	18	55.2	31.8	30	32	30	30	77	52	58	62	0.97	0.33
A..	25.358	25.65	25.04	36.0	49.0	45.4	43.5	76	19	56.1	31.7	30	29	30	30	80	50	58	62	1.96	0.66
M.	25.379	25.64	25.07	44.3	60.5	56.7	53.8	93	20	67.0	40.7	34	37	36	35	68	44	48	53	1.47	0.61
J..	25.342	25.58	25.01	46.4	65.4	61.3	57.7	93	31	72.1	43.3	37	42	40	40	72	45	47	55	0.73	0.22
J..	25.446	25.58	25.26	54.7	76.9	72.0	67.1	94	39	83.4	51.0	40	45	44	42	59	33	37	43	0.18	0.10
A..	25.367	25.54	25.20	53.5	74.5	69.0	65.7	92	32	81.0	48.9	40	46	43	43	62	38	41	47	0.21	0.21
S..	25.420	25.62	25.17	47.4	67.6	62.6	59.2	85	29	75.4	42.3	41	49	46	46	80	52	56	63	0.05	0.05
O..	25.520	25.79	25.18	39.9	59.8	53.4	51.0	85	23	67.6	34.0	33	40	37	37	78	48	55	60	0.00	0.00
N..	25.443	25.72	25.14	32.7	46.0	40.0	39.6	67	4	52.3	24.7	28	35	32	32	86	67	73	75	0.38	0.22
D..	25.427	25.77	24.71	27.5	34.8	31.6	31.3	51	10	40.4	20.0	25	29	27	27	90	82	84	85	2.40	0.91
Y..	25.400	25.79	24.71	39.2	53.9	49.6	47.6	94	-2	60.4	33.8	32	36	34	34	78	56	60	65	16.51	.....

FORT BOWIE, ARIZ.

[Latitude, 32° 40′ N.; longitude, 109° 25′ W.]

J..	.....	.....	.....	.....	.....	.....	.....	66	24	55.4	36.2	...	...	...	...	...	...	...	...	0.13	0.12
F..	.....	.....	.....	.....	.....	.....	.....	65	25	55.0	36.8	...	...	...	...	...	...	...	...	2.11	0.75
M.	.....	.....	.....	.....	.....	.....	.....	77	37	68.8	45.0	...	...	...	...	...	...	...	...	0.00	0.00
A..	.....	.....	.....	.....	.....	.....	.....	82	32	70.3	48.0	...	...	...	...	...	...	...	...	0.23	0.10
M.	.....	.....	.....	.....	.....	.....	.....	90	42	80.9	57.6	...	...	...	...	...	...	...	...	T	T
J..	.....	.....	.....	.....	.....	.....	.....	100	55	91.5	66.1	...	...	...	...	...	...	...	...	1.30	0.50
J..	.....	.....	.....	.....	.....	.....	.....	98	57	88.4	67.8	...	...	...	...	...	...	...	...	4.49	1.50
A..	.....	.....	.....	.....	.....	.....	.....	97	60	85.4	67.3	...	...	...	...	...	...	...	...	5.51	0.85
S..	.....	.....	.....	.....	.....	.....	.....	87	59	79.0	62.7	...	...	...	...	...	...	...	...	2.71	1.86
O..	.....	.....	.....	.....	.....	.....	.....	86	40	71.1	51.6	...	...	...	...	...	...	...	...	1.01	0.45
N..	.....	.....	.....	.....	.....	.....	.....	69	29	61.9	41.6	...	...	...	...	...	...	...	...	1.10	0.75
D..	.....	.....	.....	.....	.....	.....	.....	58	6	47.1	29.9	...	...	...	...	...	...	...	...	1.94	1.00
Y..	.....	.....	.....	.....	.....	.....	.....	100	6	71.2	50.9	...	...	...	...	...	...	...	...	20.53	.....

Monthly and yearly meteorological summaries—Continued.

FORT APACHE, ARIZ.

[H=5020. T=4. h=1.]

Cloudiness (in tenths).				Wind.												Number of days—										
7 a. m.	3 p. m.	10 p. m.	Mean.	Total (miles).	Maximum.	Direction.	Prevailing direction.	North.	Northeast.	East.	Southeast.	South.	Southwest.	West.	Northwest.	Calms.	Clear.	Fair.	Cloudy.	Foggy.	Rain or snow.	Max. below 32°.	Min. below 32°.	Max. above 90°.	Thunder-storms.	Auroras.	Months and year.
1.4	2.8	2.7	2.3	4,451	25	W.	E.	2	23	29	1	1	19	14	2	2	18	11	2	0	1	0	31	0	0	0	J.
3.6	5.0	2.5	3.7	5,470	37	SW.	SW.	3	14	11	4	11	28	7	5	1	13	12	3	0	5	0	22	0	0	0	F.
0.9	2.7	1.0	1.5	5,496	32	E.	E.	4	13	35	1	0	16	16	8	0	24	6	1	0	1	0	24	0	0	0	M.
3.2	3.6	2.7	3.2	6,148	42	SW.	W.	1	11	18	5	2	23	25	4	1	16	9	5	0	6	0	9	0	0	0	A.
2.4	3.6	2.1	2.7	6,918	30	S., SW., S.	E.	1	8	27	5	6	17	25	3	1	16	13	2	0	3	0	0	1	2	0	M.
3.0	3.3	3.3	3.2	6,362	38	SE.	SW.	2	8	23	3	6	28	15	4	1	18	8	4	0	6	0	0	17	4	0	J.
3.5	5.2	5.3	4.7	4,552	33	SE.	E.	2	9	31	5	2	17	19	3	5	9	16	6	0	16	0	0	17	6	0	J.
4.2	5.5	4.5	4.7	4,375	33	SE.	E.	1	8	30	9	2	18	13	7	5	8	18	5	0	17	0	0	10	4	0	A.
2.9	4.6	2.7	3.4	4,377	30	SW.	E.	1	8	31	3	8	21	13	4	1	15	10	5	0	10	0	0	1	1	0	S.
1.5	2.2	0.8	1.5	4,913	33	S., SE.	E.	2	5	48	8	4	15	8	2	1	24	7	0	0	4	0	7	0	1	0	O.
2.4	3.2	2.6	2.7	3,957	30	NE.	E.	0	16	31	1	1	24	12	4	1	20	5	5	0	8	0	21	0	0	0	N.
2.5	3.1	1.9	2.5	4,265	36	NE.	SW.	1	19	25	5	3	28	8	3	1	20	7	4	0	6	1	28	0	1	0	D.
2.6	3.7	2.7	3.0	61,284	...	.....	E.	20	142	339	50	46	256	175	49	20	201	122	42	0	83	1	142	46	19	0	Y.

FORT ASSINNIBOINE, MONT.

[H=2690. T=16. h=2.]

6.1	5.5	6.1	5.9	9,223	56	W.	SW.	6	8	4	1	0	45	15	9	5	3	19	9	0	6	21	31	0	0	0	J.
4.5	4.9	4.2	4.5	7,170	52	SW.	SW.	3	7	3	2	0	41	7	17	4	9	11	8	0	2	25	27	0	0	0	F.
5.5	5.1	4.7	5.1	10,015	55	NW.	SW.	4	13	7	7	0	42	7	13	0	9	14	8	0	1	2	24	0	0	0	M.
6.3	5.4	4.8	5.5	9,595	49	W.	SW.	6	4	3	12	7	24	17	17	0	2	23	5	0	8	0	15	0	0	0	A.
3.7	4.1	4.0	3.9	9,378	48	W.	NW.	2	6	5	3	2	19	22	34	0	14	12	5	0	0	0	1	1	0	1	M.
5.4	5.5	5.7	5.5	8,642	48	W.	NW., NE.	9	17	8	7	2	14	16	17	0	4	18	8	0	12	0	0	0	4	0	J.
3.7	2.4	3.1	3.1	6,653	41	E.	SW.	11	9	12	3	11	22	17	8	0	19	9	3	0	5	0	0	2	3	0	J.
4.4	4.8	5.6	4.9	6,750	36	NE.	NE.	4	25	15	8	5	17	5	14	0	11	10	10	0	9	0	0	0	2	0	A.
3.1	3.9	4.2	3.7	6,868	45	SW.	SW.	8	10	6	3	13	24	16	10	0	13	12	5	0	6	0	0	0	0	3	S.
5.0	5.1	3.6	4.6	9,937	53	W.	SW.	8	4	5	5	6	29	23	13	0	7	20	4	0	6	2	12	0	0	0	O.
5.7	6.3	4.1	5.4	8,803	58	W.	W.	0	4	8	7	6	26	27	5	7	5	17	8	0	2	9	20	0	0	0	N.
5.9	7.4	4.7	6.0	8,923	45	W.	W.	5	2	16	3	3	9	32	10	13	4	17	10	0	8	16	26	0	0	2	D.
4.9	5.0	4.6	4.8	101,957	...	.....	SW.	66	109	92	61	55	312	204	167	29	100	182	83	0	71	75	156	3	9	6	Y.

FORT BIDWELL, CAL.

[H=4615. T=14. h=4.]

6.0	6.7	5.3	6.0	8,072	50	SW.	W.	3	2	2	0	12	27	28	19	0	6	12	13	0	11	1	26	0	0	0	J.
6.7	7.7	6.6	7.0	4,684	44	W.	SW.	4	5	2	1	14	26	19	10	3	4	9	15	0	18	13	28	0	0	0	F.
4.3	4.3	4.9	4.5	5,912	40	W.	W.	8	0	1	0	19	22	28	11	4	13	8	10	0	6	0	19	0	0	0	M.
5.4	5.5	4.9	5.3	5,585	36	W., S.	W.	1	4	1	0	14	19	31	20	0	9	12	9	0	7	0	15	0	0	0	A.
4.8	4.6	4.4	4.6	5,954	36	SW.	W.	6	3	2	2	15	20	34	12	0	8	17	6	0	9	0	7	2	3	0	M.
4.2	3.4	4.0	3.9	4,610	32	SW.	W.	6	2	2	1	15	6	45	13	0	12	15	3	0	9	0	1	2	1	0	J.
1.2	1.3	2.0	1.5	4,777	28	SW., W	W.	7	0	2	3	18	7	51	5	0	23	6	2	0	3	0	0	4	5	0	J.
0.8	1.8	3.1	1.9	4,301	42	W.	W.	9	4	13	3	13	4	37	8	2	22	8	1	0	2	0	0	1	6	0	A.
1.2	2.5	2.5	2.1	4,476	42	SW.	W.	6	1	7	0	21	5	45	5	0	20	8	2	0	2	0	3	0	1	0	S.
0.9	1.7	0.8	1.1	3,988	42	SW.	W.	11	5	11	0	12	8	38	8	0	26	5	0	0	0	0	13	0	0	0	O.
3.3	4.4	3.8	3.8	3,199	32	W.	W.	9	1	5	0	12	14	45	3	1	13	12	5	0	5	0	23	0	0	0	N.
5.6	5.5	5.2	5.4	5,052	42	W.	W.	6	1	5	0	12	18	47	4	0	9	12	10	0	14	1	31	0	0	0	D.
3.7	4.1	4.0	3.9	59,710	...	.....	W.	76	27	53	10	177	176	448	118	10	165	124	76	0	86	15	166	9	16	0	Y.

FORT BOWIE, ARIZ.

[H=... T=4. h=..].

...	...	...	...	.....	...	.....	.....	..	0	2	0	0	18	6	0	5	20	8	3	0	2	0	7	0	0	0	J.
...	...	...	...	.....	...	.....	.....	..	0	0	2	6	12	6	0	8	12	6	10	0	5	0	8	0	0	0	F.
...	...	...	...	.....	...	.....	.....	..	3	0	1	1	13	4	1	8	23	6	2	0	0	0	0	0	0	0	M.
...	...	...	...	.....	...	.....	.....	..	1	0	0	0	25	0	0	4	13	9	8	0	4	0	1	0	0	0	A.
...	...	...	...	.....	...	.....	.....	..	1	1	0	2	17	2	0	8	18	8	5	0	0	0	0	1	2	0	M.
...	...	...	...	.....	...	.....	.....	..	1	4	1	0	17	4	0	3	17	8	5	0	4	0	0	17	5	0	J.
...	...	...	...	.....	...	.....	.....	..	0	2	4	1	17	2	0	5	9	2	20	0	8	0	0	13	9	0	J.
...	...	...	...	.....	...	.....	.....	..	1	2	2	4	12	0	0	10	9	2	20	0	13	0	0	6	13	0	A.
...	...	...	...	.....	...	.....	.....	..	3	0	2	4	9	0	0	12	21	0	9	0	4	0	0	0	4	0	S.
...	...	...	...	.....	...	.....	.....	..	1	6	2	0	13	0	0	9	21	0	10	0	3	0	0	0	0	0	O.
...	...	...	...	.....	...	.....	.....	..	0	3	0	1	16	0	0	10	18	0	12	0	3	0	2	0	0	0	N.
...	...	...	...	.....	...	.....	.....	..	1	7	1	0	11	2	0	9	24	0	7	0	7	0	15	0	0	0	D.
...	...	...	...	.....	...	.....	SW.	..	12	27	15	13	180	26	1	91	205	49	14	0	53	0	33	37	33	0	Y.

Monthly and yearly meteorological summaries—Continued.

FORT BRIDGER, WYO.

[Latitude, 41° 28′ N.; longitude, 110° 30′ W.]

Months and year.	Pressure.			Temperature.								Dew point.				Relative humidity.				Precipitation.	
	Mean.	Maximum.	Minimum.	7 a. m.	3 p. m.	10 p. m.	Mean.	Maximum.	Minimum.	Mean. Maximum.	Mean. Minimum.	7 a. m.	3 p. m.	10 p. m.	Mean.	7 a. m.	3 p. m.	10 p. m.	Mean.	Total.	Max. 24 hours.
	In.	In.	In.	°	°	°	°	°	°	°	°	°	°	°	°					In.	In.
J..	23.374	23.84	23.06	17.9	26.5	20.3	21.6	46	-15	30.8	12.3	10	13	9	10	70	54	61	62	1.44	0.53
F..	23.344	23.88	22.88	11.7	25.0	16.0	17.6	44	-10	27.2	5.7	2	9	6	6	66	50	65	60	1.24	0.60
M.	23.559	23.78	23.28	29.2	43.3	34.0	35.5	60	17	45.6	27.0	18	22	21	20	63	45	60	56	0.33	0.18
A..	23.422	23.67	23.04	30.1	49.1	36.8	38.7	70	7	51.1	28.4	20	31	26	26	67	51	66	61	0.37	0.11
M.	23.511	23.73	23.18	37.0	60.8	52.6	50.1	81	26	63.4	35.4	25	41	38	35	62	51	58	57	0.71	0.38
J..	23.472	23.77	23.13	44.1	70.4	60.6	58.4	81	30	72.9	41.7	31	42	40	38	62	38	48	49	0.16	0.13
J..	23.617	23.77	23.47	52.2	75.5	65.2	64.3	87	40	77.7	49.5	38	46	44	43	59	36	47	47	0.58	0.31
A..	23.542	23.73	23.35	48.5	72.9	62.3	61.2	86	38	71.9	45.9	34	47	44	42	58	43	51	51	2.21	1.00
S..	23.577	23.75	23.25	38.8	69.7	57.8	55.4	78	30	71.1	36.5	24	42	38	35	56	38	49	48	0.41	0.15
O..	23.581	23.92	23.11	31.4	54.0	42.3	42.6	77	11	55.1	28.6	20	31	26	26	63	44	54	54	0.48	0.23
N..	23.539	23.74	23.13	22.6	46.8	34.1	34.5	62	- 2	48.3	21.0	11	23	19	18	62	40	55	53	0.27	0.21
D..	23.458	23.79	22.93	10.2	27.8	20.1	19.4	42	-18	29.9	7.4	0	12	8	6	63	52	60	59	0.70	0.31
Y..	23.499	23.92	22.88	31.1	51.8	41.8	41.6	87	-18	53.8	28.3	20	30	27	25	62	45	56	55	8.90	.....

FORT BUFORD, DAK.

[Latitude, 48° N.; longitude, 103° 56′ W.]

J..	27.842	28.51	27.23	- 8.5	1.3	- 3.9	- 3.7	42	-45	8.0	-16.1	-10	- 2	- 6	- 6	92	85	90	89	0.51	0.17
F..	28.028	28.65	27.45	-11.4	0.9	- 4.4	- 5.0	47	-41	4.2	-17.6	-14	- 4	- 8	- 8	90	82	87	87	0.18	0.08
M.	27.997	28.63	27.34	21.5	32.8	26.7	27.0	59	-10	38.5	16.9	18	22	21	20	86	66	80	78	0.12	0.05
A..	27.861	28.27	27.36	34.0	51.7	44.1	43.3	88	12	55.4	31.6	28	31	32	30	80	50	66	65	1.09	0.55
M.	27.873	28.52	27.38	47.2	67.1	60.5	58.3	93	32	71.9	45.4	39	37	40	39	75	38	53	55	1.59	0.92
J..	27.862	28.17	27.55	57.3	74.4	66.8	66.2	98	39	78.3	54.3	50	50	51	50	79	45	60	61	3.25	1.03
J..	27.963	28.14	27.69	57.8	76.4	69.5	67.9	98	45	80.9	55.4	52	51	54	53	82	45	61	62	2.00	0.86
A..	27.938	28.28	27.58	56.4	72.3	64.6	64.4	92	44	75.7	55.1	53	52	54	53	88	52	72	71	3.91	1.64
S..	27.957	28.35	27.54	48.2	67.7	58.8	58.2	89	31	71.9	46.1	42	44	45	44	79	45	62	62	1.07	0.59
O.	27.997	28.44	27.35	32.0	49.0	39.6	40.2	80	0	53.0	28.5	26	30	29	28	81	52	69	67	1.43	0.69
N..	27.981	28.47	27.45	20.1	35.4	24.6	26.7	68	-29	38.9	14.3	15	20	16	17	81	57	73	71	0.10	0.08
D..	27.968	28.63	27.47	5.7	13.8	8.7	9.4	45	-25	19.8	- 1.3	2	7	4	5	85	76	82	81	0.18	0.08
Y..	27.939	28.65	27.23	30.0	45.2	38.0	37.7	98	-45	49.7	26.0	25	28	28	27	83	58	71	71	15.43	.....

FORT CANBY, WASH.

[Latitude, 46° 16′ N.; longitude, 124° 4′ W.]

J..	29.793	30.18	29.16	41.0	44.9	43.6	43.2	54	33	48.2	39.5	40	43	41	41	96	94	92	94	11.91	1.43
F..	29.711	30.19	29.28	32.1	35.9	35.2	34.4	54	14	39.9	30.3	30	32	31	31	90	84	86	87	6.29	2.18
M.	29.879	30.33	29.38	43.4	47.6	45.2	45.4	65	34	50.4	41.4	41	42	41	41	92	82	86	87	14.12	2.23
A..	29.867	30.27	29.35	43.6	49.4	46.0	46.3	58	36	52.4	42.0	40	44	42	42	89	84	87	87	6.38	1.61
M.	29.829	30.15	29.24	48.6	54.8	52.5	52.0	78	38	59.5	47.2	44	47	46	46	87	78	81	82	4.88	0.83
J..	29.859	30.07	29.51	51.2	57.2	53.8	54.1	91	44	60.6	49.6	47	48	48	48	86	74	82	80	0.95	0.28
J..	29.937	30.11	29.72	52.3	57.4	55.3	55.0	67	46	60.0	51.3	50	52	51	51	92	83	86	87	0.33	0.15
A..	29.827	30.10	29.68	54.3	59.3	56.8	56.8	73	48	61.9	53.6	52	55	54	54	94	85	89	89	0.16	0.13
S..	29.824	30.10	29.54	52.2	58.0	56.0	55.4	78	46	61.7	51.6	50	54	52	52	94	83	87	88	3.63	1.82
O..	29.915	30.24	29.40	50.6	55.4	53.5	53.2	72	42	58.6	49.5	48	51	50	50	92	84	88	88	2.73	0.61
N..	29.840	30.25	29.37	44.1	48.4	47.1	46.5	59	33	51.5	42.8	42	44	44	43	92	86	88	89	7.25	1.48
D..	29.772	30.40	29.03	42.0	45.1	43.6	43.6	52	34	47.5	39.8	41	43	41	41	96	92	92	94	15.18	2.17
Y..	29.840	30.40	29.03	46.3	51.1	49.0	48.8	91	14	54.4	44.9	44	46	45	45	92	84	87	88	73.81	.....

FORT CUSTER, MONT.

[Latitude, 45° 42′ N.; longitude, 107° 34′ W.]

J..	26.671	27.24	25.88	14.5	20.1	14.9	16.5	47	-30	27.2	4.7	13	14	11	13	83	77	81	80	1.31	0.31
F..	26.829	27.33	26.19	- 3.6	7.1	3.7	2.4	51	-34	16.8	- 8.2	- 1	4	3	2	82	76	80	79	0.32	0.26
M.	26.853	27.31	26.38	31.4	43.9	38.3	37.9	72	- 2	49.8	27.4	26	28	29	27	81	57	71	69	1.19	0.63
A..	26.744	27.14	26.32	37.5	53.3	48.0	46.3	82	25	58.4	34.9	32	26	32	30	83	41	56	60	2.16	1.29
M.	26.810	27.33	26.22	45.3	66.5	61.1	57.6	92	32	71.8	43.3	37	31	37	35	75	32	45	51	1.15	0.41
J..	26.752	27.16	26.35	54.5	73.6	68.4	65.5	103	39	79.4	52.2	47	46	47	47	77	40	51	56	0.97	0.39
J..	26.870	27.04	26.64	58.7	80.5	74.9	71.4	98	44	84.9	56.3	48	47	47	47	71	34	42	49	0.67	0.45
A..	26.820	27.12	26.48	56.1	77.0	70.7	67.9	94	41	81.6	53.5	46	43	47	45	72	34	46	51	1.48	0.45
S..	26.851	27.19	26.53	49.5	69.8	61.7	60.3	87	34	74.0	44.5	40	40	43	41	74	38	53	55	1.13	0.53
O..	26.927	27.34	26.34	34.7	52.5	43.3	43.5	85	-15	57.9	30.2	28	30	31	30	80	50	66	65	1.31	0.42
N..	26.875	27.22	26.37	25.3	44.3	32.6	34.1	72	-20	47.1	20.6	16	18	18	18	73	43	61	59	0.05	0.02
D..	26.830	27.42	26.42	16.2	27.4	21.0	21.5	58	-20	31.4	9.3	8	13	11	11	72	60	70	67	0.44	0.13
Y..	26.819	27.42	25.88	35.0	51.3	44.9	43.7	103	-34	56.7	30.7	28	28	30	29	77	48	60	62	12.18	.....

Monthly and yearly meteorological summaries—Continued.

FORT BRIDGER, WYO.

[H = 6,643. T = 16. h = 2.]

Cloudiness (in tenths).				Wind.													Number of days—										
7 a. m.	3 p. m.	10 p. m.	Mean.	Total (miles).	Maximum.	Direction.	Prevailing direction.	North.	Northeast.	East.	Southeast.	South.	Southwest.	West.	Northwest.	Calms.	Clear.	Fair.	Cloudy.	Foggy.	Rain or snow.	Max. below 32°.	Min. below 32°.	Max. above 90°.	Thunder-storms.	Auroras.	Months and year.
6.3	6.2	3.6	5.4	12,958	55	SW.	SW.	1	0	0	0	4	50	27	11	0	7	13	11	0	11	14	31	0	0	0	J.
5.1	5.8	4.8	5.2	6,481	47	W.	SW.	7	3	4	4	4	30	19	8	5	10	8	10	0	11	18	28	0	0	0	F.
4.1	5.6	3.1	4.3	8,320	48	SW.	W.	4	3	0	0	1	32	38	10	5	10	18	3	0	4	0	23	0	0	0	M.
5.3	6.6	5.5	5.8	8,333	40	W., SW	W.	8	6	1	1	5	22	36	8	3	5	17	8	0	9	1	18	0	0	0	A.
2.9	5.3	4.4	4.2	7,092	36	W., SW	W.	10	17	2	0	5	20	32	7	0	6	23	2	0	4	0	6	0	1	0	M.
3.9	5.5	4.3	4.6	6,816	38	SW.	W.	5	6	1	0	6	19	40	11	2	7	19	4	0	2	0	2	0	2	0	J.
3.5	5.8	4.0	4.4	4,561	36	SW., W	W.	6	9	1	3	5	25	29	14	1	8	20	3	0	6	0	0	0	3	0	J.
2.7	6.4	4.5	4.9	5,344	48	W.	W.	7	9	7	9	6	19	32	4	0	8	19	4	0	9	0	0	0	3	0	A.
2.5	4.4	2.9	3.6	5,420	54	SW.	W.	2	12	1	5	5	21	36	8	0	15	11	4	0	4	0	2	0	0	0	S.
4.3	4.6	3.5	4.1	7,597	60	W.	W.	3	11	2	4	4	14	46	7	2	10	16	5	0	5	0	22	0	0	0	O.
4.3	4.9	3.3	4.2	5,124	40	E.	E.	2	22	28	1	4	9	18	5	1	11	15	4	0	3	3	28	0	0	0	N.
5.3	6.8	4.2	5.6	7,930	48	SW.	W.	5	24	21	2	2	9	26	2	2	3	19	9	0	9	19	31	0	0	0	D.
4.5	5.7	4.0	4.7	86,976	..	.....	W.	60	122	68	29	51	270	379	95	21	100	198	67	0	77	55	191	0	9	0	Y.

FORT BUFORD, DAK.

[H = 1,854. T = 17. h = 1.]

5.5	6.7	5.1	5.8	6,489	47	W.	W.	8	14	15	1	13	6	17	15	4	8	12	11	0	9	28	31	0	0	3	J.
5.0	6.7	3.5	5.1	5,544	33	W.	NW.	3	6	12	8	3	18	17	21	1	6	14	8	0	4	26	28	0	0	2	F.
6.4	6.7	5.3	6.1	7,999	57	W.	NW.	9	9	13	12	13	5	12	20	0	3	19	9	0	3	10	29	0	0	0	M.
6.6	7.7	7.0	7.1	7,737	43	NW.	N.	16	15	14	8	9	2	9	15	2	0	18	12	0	5	0	17	0	2	0	A.
5.8	6.0	5.6	5.8	9,584	46	NW.	NW.	9	4	8	5	15	8	14	30	0	2	21	8	0	7	0	0	1	1	0	M.
6.3	5.9	6.9	6.4	8,392	52	NW.	W.	4	11	17	18	3	2	20	15	0	1	19	10	0	13	0	0	3	7	0	J.
5.8	6.2	6.3	6.1	6,111	48	NW.	E.	10	14	22	5	7	4	14	12	5	4	15	12	0	13	0	0	3	10	0	J.
7.2	7.1	6.3	6.9	6,166	48	N., NW	E.	9	17	33	12	4	3	7	8	0	3	15	13	0	12	0	0	2	6	1	A.
4.7	4.9	3.0	4.2	6,169	35	NW.	NE.	6	13	15	17	8	1	10	19	1	10	16	4	0	4	0	1	0	2	2	S.
4.1	6.5	4.2	4.9	6,793	50	W.	W.	2	8	5	4	14	10	24	21	5	9	16	6	0	9	2	20	0	0	3	O.
4.7	5.5	4.8	5.0	6,199	60	NW.	W.	2	1	10	9	15	9	21	18	5	8	14	8	0	3	10	24	0	0	0	N
4.7	6.6	4.7	5.3	8,589	50	NW.	NW.	3	7	22	2	9	10	10	28	2	5	19	7	0	5	21	31	0	0	4	D.
5.6	6.4	5.5	5.7	85,772	..	.....	NW.	81	119	186	101	113	73	175	222	25	59	198	108	0	87	97	181	9	28	15	Y.

FORT CANBY, WASH.

[H = 179. T = 7. h = 2.]

8.6	9.5	7.9	8.7	10,762	56	SW., W	W.	0	0	0	19	16	10	41	5	2	1	8	22	0	28	0	0	0	0	0	J.
7.4	6.9	6.1	6.8	9,680	58	S.	SE.	7	1	6	33	13	0	14	8	2	6	6	16	0	16	5	14	0	0	0	F.
7.5	8.5	8.2	8.1	12,156	60	S.	S.	6	0	0	28	37	2	13	5	2	1	11	19	0	17	0	0	0	1	0	M.
7.8	8.7	8.4	8.3	8,846	58	S.	W.	13	0	0	8	20	13	25	6	1	2	6	22	0	23	0	0	0	1	0	A.
6.6	7.9	6.8	7.1	9,345	72	S.	S.	14	1	0	7	42	7	19	2	1	5	8	18	0	12	0	0	0	0	0	M.
7.6	7.5	7.5	7.5	5,794	26	S.	W.	25	0	0	1	21	1	34	7	1	3	8	19	0	8	0	0	1	0	0	J.
5.1	5.7	5.4	5.4	5,301	25	N.	N.	31	5	1	0	14	4	9	25	4	8	14	9	0	5	0	0	0	0	0	J.
7.8	6.6	6.2	6.9	4,586	30	S.	NW.	22	2	0	0	17	3	14	24	11	5	8	18	1	1	0	0	0	0	0	A.
4.4	4.9	3.9	4.4	6,235	58	S.	N.	27	2	0	3	24	1	9	14	10	11	12	7	0	8	0	0	0	0	0	S.
4.5	5.7	4.4	4.9	8,197	54	S.	S.	17	2	4	22	23	6	6	11	2	11	11	9	0	14	0	0	0	0	0	O.
5.4	6.2	5.4	5.7	10,583	88	S.	SE.	15	3	1	41	17	5	2	3	3	11	7	12	0	16	0	0	0	2	0	N.
7.2	7.4	6.7	7.1	13,830	84	S.	SE.	7	1	0	36	17	11	16	3	2	6	7	18	1	22	0	0	0	0	0	D.
6.7	7.1	6.4	6.7	105,315	..	.....	S.	184	17	12	198	261	63	206	113	41	70	106	189	2	170	5	14	1	4	0	Y.

FORT CUSTER, MONT.

[H = 3,040. T = 18. h = 26.]

7.4	6.5	5.9	6.6	6,521	38	N.	SW.	16	2	2	15	6	22	16	12	2	5	13	13	0	11	15	31	0	0	0	J.
5.1	5.6	4.0	4.9	3,820	38	N.	SE.	15	7	6	22	4	15	6	6	3	8	16	4	0	4	21	27	0	0	0	F.
5.5	6.7	5.0	5.7	5,627	45	N.	SE.	12	14	1	25	8	14	10	8	1	5	18	8	0	11	3	21	0	0	0	M.
5.5	6.8	6.7	6.3	6,017	41	NW.	N.	19	9	10	12	10	6	11	12	1	3	15	12	0	9	0	9	0	0	0	A.
3.8	4.5	5.4	4.6	6,373	38	W.	N., SE.	21	5	7	21	10	14	8	6	1	12	14	5	0	11	0	0	2	2	1	M.
4.2	4.2	5.2	4.5	6,223	48	SE.	SE.	20	11	5	26	5	9	6	7	1	9	16	5	0	11	0	0	5	6	0	J.
3.2	3.5	4.4	3.7	5,076	48	NW.	N.	29	7	10	19	9	8	5	5	1	10	18	3	0	9	0	0	6	9	0	J.
3.9	2.8	4.6	3.9	5,275	60	NW.	N.	23	18	13	10	6	10	2	10	1	14	14	3	0	12	0	0	4	8	0	A.
2.9	3.3	2.5	2.9	4,635	37	NW.	SE.	16	6	10	30	4	6	3	14	1	17	11	2	0	5	0	0	0	3	0	S.
4.5	4.8	4.3	4.5	4,999	50	N.	SE.	20	2	8	24	2	21	8	7	1	12	12	7	0	10	2	13	0	0	0	O.
4.2	5.2	3.9	4.4	4,609	60	NW.	SE.	10	9	6	21	8	18	6	12	0	10	14	6	0	3	9	20	0	0	0	N.
5.0	6.3	4.9	5.4	4,853	36	N.	N.	19	9	3	14	6	12	13	15	2	5	21	5	0	10	12	29	0	0	1	D.
4.6	5.1	4.7	4.8	64,028	..	.....	SE.	220	99	81	239	78	155	94	114	15	1.0	182	73	0	106	62	158	17	28	1	Y.

Monthly and yearly meteorological summaries—Continued.

FORT SILL, IND. T.

[Latitude, 34° 40′ N.; longitude, 98° 23′ W.]

Months and year.	Pressure.			Temperature.								Dew point.				Relative humidity.				Precipitation.	
	Mean.	Maximum.	Minimum.	7 a. m.	3 p. m.	10 p. m.	Mean.	Maximum.	Minimum.	Mean. Maximum.	Mean. Minimum.	7 a. m.	3 p. m.	10 p. m.	Mean.	7 a. m.	3 p. m.	11 p. m.	Mean.	Total.	Max. 24 hours.
	In.	In.	In.	°	°	°	°	°	°	°	°	°	°	°	°					In.	In.
J..	28.798	29.41	28.30	27.8	48.0	36.4	37.4	76	0	51.2	24.4	18	13	19	17	68	30	51	50	0.00	0.00
F..	28.878	29.32	28.22	34.0	49.6	43.9	42.5	72	8	54.0	31.5	29	30	32	30	84	54	67	68	0.82	0.38
M..	28.803	29.18	28.39	41.9	66.1	54.5	54.2	86	26	69.3	40.7	32	31	33	32	67	30	48	48	0.60	0.30
A..	28.730	29.19	28.29	51.3	73.4	63.6	62.8	95	35	76.3	49.8	44	47	48	46	78	42	60	60	2.06	1.60
M..	28.722	29.01	28.33	63.2	79.2	71.3	71.2	93	42	82.5	61.0	58	57	59	58	83	49	68	67	5.36	1.55
J..	28.716	28.88	28.48	70.4	84.9	76.6	77.3	97	60	88.1	68.5	66	66	67	66	86	55	72	71	3.69	2.08
J..	28.755	28.90	28.59	73.5	94.7	83.7	84.0	105	66	97.6	71.7	67	63	63	65	82	38	53	58	3.11	1.06
A..	28.723	28.91	28.56	70.9	90.7	79.6	80.4	104	56	92.3	69.9	56	63	65	65	88	44	63	64	5.80	1.86
S..	28.790	28.99	28.59	65.2	81.4	72.4	73.0	96	48	82.8	64.4	61	62	63	62	87	54	73	72	5.19	2.08
O..	28.854	29.21	28.41	49.9	67.7	57.1	58.2	89	31	69.5	48.7	45	48	49	47	83	52	74	70	6.20	4.14
N..	28.868	29.30	28.47	39.0	60.4	47.4	48.9	76	8	62.4	36.7	32	34	34	33	76	42	61	60	0.34	0.12
D..	28.830	29.36	28.28	31.1	43.0	35.9	36.7	68	8	47.1	27.9	26	30	30	29	83	63	79	75	0.91	0.43
Y..	28.789	29.41	28.22	51.5	69.9	60.2	60.5	105	0	72.8	49.6	45	45	47	46	80	47	64	64	34.17	.....

FORT SMITH, ARK.

[Latitude, 35° 22′ N.; longitude, 94° 24′ W.]

J..	29.568	30.15	28.92	28.7	47.0	37.8	37.8	73	-4	49.3	25.6	25	29	30	28	85	52	74	71	0.79	0.40
F..	29.650	30.05	28.90	38.2	51.3	45.7	45.1	75	20	55.1	35.7	36	38	40	38	90	64	82	79	4.39	2.45
M..	29.555	29.85	29.24	43.5	63.5	56.2	54.4	76	28	66.4	41.7	41	50	50	47	92	63	80	78	1.53	1.06
A..	29.503	29.90	29.04	51.7	74.3	65.4	63.8	91	30	76.4	50.3	47	53	57	52	83	51	76	70	2.31	1.00
M..	29.480	29.75	29.12	61.2	79.4	71.0	70.5	92	50	81.8	59.3	56	59	64	60	85	54	80	73	6.51	1.95
J..	29.479	29.64	29.32	66.7	84.0	76.4	75.7	95	57	86.8	65.6	61	65	67	64	81	56	73	70	2.30	0.80
J..	29.485	29.65	29.34	72.3	91.2	81.0	81.5	104	65	93.8	69.9	68	71	71	70	86	54	72	71	2.26	0.99
A..	29.463	29.61	29.31	70.4	86.5	77.4	78.1	101	57	89.2	69.0	67	69	69	68	90	58	77	75	4.94	1.21
S..	29.511	29.72	29.22	65.1	82.2	73.6	73.6	97	45	84.6	64.2	62	61	64	63	90	52	74	72	3.74	1.32
O..	29.597	29.93	29.26	52.0	69.3	59.5	60.3	90	32	71.7	49.8	46	45	49	47	81	45	68	65	3.47	2.70
N..	29.627	30.11	29.28	39.8	60.3	50.1	50.1	79	17	63.2	37.1	33	35	37	35	76	43	62	61	2.23	1.67
D..	29.609	30.17	29.08	34.0	43.3	37.8	38.4	72	8	47.1	30.9	28	32	31	30	78	65	76	73	4.22	2.17
Y..	29.544	30.17	28.90	52.0	69.4	61.0	60.8	104	-4	72.1	49.9	48	51	52	50	85	55	75	71	38.69	.....

FORT STANTON, N. MEX.

[Latitude, 33° 30′ N.; longitude, 105° 26′ W.]

J..	23.894	24.32	23.66	24.8	46.4	36.7	36.0	65	4	50.1	22.4	18	20	23	20	74	38	59	57	0.01	0.01
F..	23.920	24.27	23.62	28.2	50.4	39.5	39.4	67	12	53.5	26.6	22	25	26	25	76	42	62	60	0.11	0.05
M..	23.992	24.29	23.71	29.7	57.7	44.6	44.0	73	14	61.2	28.5	20	23	26	23	68	31	52	50	0.25	0.24
A..	23.897	24.23	23.66	34.4	61.2	50.4	48.7	78	21	64.8	33.6	23	20	26	23	64	23	43	43	0.04	0.04
M..	23.979	24.20	23.66	41.2	69.3	56.8	55.8	84	29	72.6	41.0	30	37	38	35	64	34	53	50	0.72	0.49
J..	23.984	24.19	23.85	52.1	76.3	65.1	64.5	90	43	80.3	51.7	43	52	53	49	72	45	66	61	2.50	0.51
J..	24.086	24.22	23.98	53.6	77.6	65.5	65.6	91	47	82.3	53.3	48	55	56	53	82	49	71	67	2.59	0.69
A..	24.035	24.19	23.88	53.8	72.6	64.0	63.5	90	44	79.3	53.7	48	54	56	53	82	55	76	71	3.49	0.96
S..	24.068	24.19	23.94	51.1	69.4	59.8	60.1	79	40	72.8	50.8	46	54	55	52	84	60	84	76	4.21	0.86
O..	24.025	24.34	23.57	35.6	62.4	47.6	48.5	80	22	64.4	35.1	30	40	39	36	82	48	74	68	1.75	1.69
N..	23.903	24.18	23.68	27.7	56.2	41.1	41.7	69	12	58.4	25.8	22	32	30	28	78	44	65	63	0.17	0.09
D..	23.879	24.14	23.51	21.0	39.2	29.9	30.0	57	-18	42.9	17.6	12	20	19	17	69	50	65	61	0.93	.33
Y..	23.979	24.34	23.51	37.8	61.6	50.1	49.8	91	-18	65.2	36.7	30	36	37	34	75	43	64	61	16.77	.....

FORT SULLY, DAK.

[Latitude, 44° 39′ N.; longitude, 100° 39′ W.]

J..	28.233	28.92	27.36	-2.2	7.7	3.8	3.1	34	-28	13.7	-6.6	-9	-0	-3	-4	72	72	72	72	1.03	0.35
F..	28.352	29.00	27.72	-4.2	6.7	4.1	2.2	49	-26	11.3	-7.2	-12	-2	-4	-6	71	69	69	70	0.18	0.18
M..	28.370	28.97	27.86	27.8	41.2	33.1	34.0	62	-8	44.5	24.2	21	31	26	26	75	72	75	74	T.	T.
A..	28.207	28.57	27.88	51.6	60.4	54.6	55.5	92	19	63.7	45.8	44	46	43	44	77	65	68	70	0.90	0.35
M..	28.206	28.79	27.67	56.4	73.0	63.5	64.3	92	32	77.2	50.4	46	47	46	46	70	43	56	57	1.28	0.40
J..	28.192	28.47	27.94	60.9	79.2	71.6	70.6	99	41	82.7	58.2	55	54	56	55	81	45	60	62	2.88	0.72
J..	28.248	28.46	27.97	65.0	84.7	74.8	74.8	104	53	88.2	62.4	59	56	59	58	82	40	59	63	3.04	1.04
A..	28.251	28.54	27.82	59.9	74.9	68.2	67.7	98	43	79.7	58.0	56	56	57	57	88	56	71	72	3.12	0.84
S..	28.310	28.70	27.85	53.0	72.6	62.8	62.8	94	35	76.0	50.8	47	47	48	48	83	44	60	62	0.35	0.20
O..	28.340	28.81	27.85	37.4	53.8	45.2	45.5	78	4	57.3	33.6	31	32	32	32	78	48	64	63	0.85	0.36
N..	28.343	28.76	27.81	23.4	42.9	32.8	33.0	77	-27	46.7	19.4	16	20	19	18	76	47	60	61	0.13	0.13
D..	28.322	28.83	27.89	9.5	18.9	13.3	13.9	46	-18	23.3	3.4	5	12	9	9	83	74	84	80	0.50	0.20
Y..	28.285	29.00	27.36	36.5	51.3	44.0	43.9	104	-28	55.4	32.7	30	33	32	32	78	56	67	67	14.26	.....

Monthly and yearly meteorological summaries—Continued.

FORT SILL, IND. T.

[H=1,200. T=6. h=5.]

Cloudiness (in tenths).				Wind.													Number of days—										
7 a. m.	3 p. m.	10 p. m.	Mean.	Total (miles).	Minimum.	Direction.	Prevailing direction.	North.	Northeast.	East.	Southeast.	South.	Southwest.	West.	Northwest.	Calms.	Clear.	Fair.	Cloudy.	Foggy.	Rain or snow.	Max. below 32°.	Min. below 32°.	Max. above 90°.	Thunder-storms.	Auroras.	Months and year.
1.6	2.2	1.9	1.9	9,902	44	SW., N.	N.	32	0	0	0	12	19	11	17	2	21	9	1	0	0	5	20	0	0	0	J.
3.9	4.1	3.7	3.9	8,954	50	SW.	N.	31	4	2	4	21	10	2	5	5	14	7	7	1	5	2	11	0	1	0	F.
2.3	1.9	1.8	2.0	9,753	37	SW., N.	N.	45	3	3	7	16	13	1	3	2	22	7	2	0	2	0	1	0	1	0	M.
2.5	3.3	2.2	3.0	9,920	52	N.	S.	17	5	4	4	40	5	5	5	5	18	8	4	0	6	0	0	3	2	0	A.
4.3	4.2	3.1	3.9	7,718	36	S.	S.	28	6	7	15	33	2	1	4	2	11	15	5	0	12	0	0	2	6	0	M.
3.7	3.8	3.1	3.5	6,761	40	SW.	S.	7	4	9	11	43	10	1	4	1	13	13	4	0	8	0	0	11	3	0	J.
2.0	2.5	2.0	2.5	5,781	36	SE.	S.	10	9	9	22	31	7	3	1	1	21	10	0	0	9	0	0	27	2	0	J.
3.4	5.0	2.1	3.5	7,454	32	E.	SE.	18	6	12	36	12	5	0	2	2	17	11	3	0	15	0	0	20	7	0	A.
2.9	5.2	2.7	3.9	7,028	36	NW.	S.	22	7	8	16	27	2	1	7	0	12	13	5	0	11	0	0	7	1	0	S.
1.9	2.5	2.2	2.2	8,416	46	SW.	N.	44	1	2	6	26	3	1	2	8	22	5	4	0	5	0	1	0	0	0	O.
2.7	3.1	2.4	2.7	6,690	38	N.	N.	33	3	0	8	25	4	1	5	11	19	6	5	0	5	1	8	0	0	0	N.
3.8	4.5	3.1	3.8	8,253	60	N.	N.	45	2	1	2	25	4	3	8	3	14	11	6	0	10	2	19	0	1	0	D.
3.0	3.6	2.6	3.1	96,630	...	.....	N.	327	50	57	131	311	84	30	63	42	204	115	46	1	88	10	60	70	24	0	Y.

FORT SMITH, ARK.

[H=470. T=54. h=48.]

3.4	3.8	2.9	3.4	4,339	28	W.	E.	16	3	18	4	9	15	13	8	7	14	15	2	0	3	5	21	0	0	0	J.
6.7	5.7	5.6	6.0	4,501	37	NW.	E.	14	3	20	17	5	4	9	9	3	7	9	12	0	9	1	11	0	0	0	F.
4.2	4.3	2.8	3.8	4,448	21	NW.	NE.	11	18	16	17	10	3	6	9	3	15	9	7	0	5	4	0	0	0	0	M.
4.1	4.3	4.2	4.2	4,557	26	N.	S.	9	10	10	10	22	13	4	9	3	11	14	5	0	9	0	1	2	2	0	A.
4.9	5.1	4.6	4.9	2,853	18	E., NW.	E.	3	5	18	14	13	8	7	13	12	11	12	8	0	14	0	0	1	5	0	M.
3.5	4.4	2.7	3.5	2,985	29	SW.	SE.	5	7	19	32	6	8	3	2	8	17	8	5	0	7	0	0	5	3	0	J.
2.3	3.8	2.8	3.0	1,923	40	W.	SE.	4	5	12	19	5	6	10	4	28	16	14	1	0	10	0	0	24	5	0	J.
3.6	4.7	2.9	3.7	3,062	30	N.	SE.	5	6	13	36	11	7	4	2	9	14	12	5	0	12	0	0	18	7	0	A.
3.9	4.1	3.2	3.7	2,863	18	S., SW.	SE.	5	4	20	28	5	5	7	7	9	15	10	5	0	10	0	0	13	0	0	S.
3.5	4.9	3.0	3.2	2,276	24	SW.	NE.	13	19	10	17	9	7	6	5	7	19	4	8	0	4	0	0	0	0	0	O.
3.0	2.5	2.5	2.7	3,216	28	N.	SE.	6	9	5	33	2	3	8	12	12	20	5	5	0	8	0	7	0	0	0	N.
5.5	6.0	4.9	5.5	4,446	24	N., NW., SW.	SE.	12	10	16	25	2	4	8	13	3	9	10	12	0	13	4	17	0	0	0	D.
4.0	4.3	3.6	4.0	42,469	...	.....	SE.	103	99	177	252	99	83	85	93	104	168	122	75	0	104	14	57	63	22	0	Y.

FORT STANTON, N. MEX.

[H=6,150. T=30. h=1.]

1.5	1.2	1.1	1.3	9,014	51	NW.	NW.	2	0	4	8	1	6	20	51	1	26	4	1	0	1	0	27	0	0	0	J.
2.8	2.6	2.3	2.6	7,190	44	W.	W.	1	3	3	6	3	9	30	29	0	19	5	4	0	3	0	22	0	0	0	F.
1.5	1.8	1.8	1.7	6,277	37	NW.	NW.	3	0	1	18	0	4	22	43	2	24	5	2	0	2	0	22	0	0	0	M.
1.9	2.6	1.5	2.0	6,331	39	SW.	NW.	2	0	3	10	5	10	21	32	7	22	7	1	0	1	0	13	0	0	0	A.
1.3	2.8	2.2	2.1	4,655	36	NW.	NW.	2	3	4	10	9	8	18	25	14	20	10	1	0	5	0	1	0	0	0	M.
1.6	4.0	3.2	2.9	3,345	33	SW.	SE.	0	5	3	25	10	10	14	13	10	19	9	2	0	11	0	0	0	0	0	J.
2.6	4.7	4.1	3.8	3,062	30	N., SW.	W.	3	5	4	13	8	14	20	18	8	13	14	4	0	12	0	0	2	0	0	J.
3.2	5.2	3.5	4.0	2,904	27	S., W.	W.	1	6	6	10	10	17	23	12	8	10	19	2	0	12	0	0	0	0	0	A.
2.5	3.8	3.0	3.1	2,538	24	SW.	SE.	3	3	4	21	2	8	11	20	18	16	12	2	0	17	0	0	0	0	0	S.
2.2	2.2	2.5	2.3	2,662	30	NW.	SE.	7	1	3	21	4	6	17	18	22	23	4	4	0	3	0	9	0	0	0	O.
2.1	2.6	1.1	1.9	4,028	30	NW.	NW.	5	0	4	3	2	7	21	28	19	19	9	1	0	4	0	25	0	0	0	N.
3.4	3.7	1.9	3.0	6,451	50	SW.	NW.	4	0	2	8	2	8	9	39	21	16	14	1	0	7	3	28	0	0	0	D.
2.2	3.1	2.4	2.6	58,457	..	.....	NW.	27	26	41	153	56	107	226	328	130	227	112	25	0	78	3	147	2	0	0	Y.

FORT SULLY, DAK.

[H=1,600. T=15. h=1.]

3.8	6.0	3.5	4.4	5,294	54	NW.	NW.	3	4	6	8	1	0	6	29	36	7	20	4	0	6	28	31	0	0	0	J.
2.9	5.0	3.5	3.8	6,033	44	NW.	NW.	3	0	8	11	1	1	0	29	31	12	12	4	0	1	24	28	0	0	0	F.
6.5	5.7	5.5	5.9	7,926	52	NW.	NW.	7	2	9	10	1	3	0	41	20	5	17	9	0	0	6	25	0	0	0	M
5.3	5.5	4.8	5.4	7,579	48	NW.	NW.	8	8	7	13	2	1	4	33	14	9	10	11	0	6	0	3	1	0	0	A.
3.7	4.6	3.1	3.8	7,546	56	NE.	NW.	7	1	7	18	2	1	3	34	20	14	11	6	0	7	0	0	3	0	0	M.
5.1	4.2	4.2	4.5	8,174	42	SE.	E.	15	4	23	16	2	0	6	16	8	8	17	5	0	10	0	0	5	10	0	J.
4.7	3.6	4.9	4.4	7,175	47	S.	E.	13	15	20	9	9	3	7	11	6	10	17	4	0	11	0	0	13	12	1	J.
5.6	4.8	4.2	4.9	7,428	48	E.	E.	12	12	28	17	3	3	4	10	4	10	13	8	0	13	0	0	3	12	0	A.
4.6	2.7	2.6	3.3	7,803	42	W.	E.	6	2	31	12	1	0	13	15	9	13	12	4	0	4	0	0	2	3	0	S.
3.0	4.6	3.8	3.8	7,228	44	W.	W.	6	2	22	6	3	0	42	7	5	15	9	7	0	5	1	11	0	1	0	O.
2.8	4.1	3.1	3.3	5,938	52	W.	W.	0	3	20	6	1	0	37	6	17	16	11	3	0	2	9	24	0	0	5	N.
5.0	5.5	4.6	5.0	6,820	43	W.	W.	3	2	25	0	0	0	35	15	13	8	19	4	0	9	21	30	0	0	0	O.
4.5	4.7	4.0	4.4	84,944	..	.....	NW.	83	55	206	126	20	12	157	246	183	127	168	69	0	74	89	152	27	36	0	Y.

Monthly and yearly meteorological summaries—Continued.

FORT TOTTEN, D. T.

[Latitude, 47° 57′ N.; longitude, 98° 57′ W.]

Months and year.	Pressure.			Temperature.								Dew point.				Relative humidity.				Precipitation.	
	Mean.	Maximum.	Minimum.	7 a. m.	3 p. m.	10 p. m.	Mean.	Maximum.	Minimum.	Mean. Maximum.	Mean. Minimum.	7 a. m.	3 p. m.	10 p. m.	Mean.	7 a. m.	3 p. m.	10 p. m.	Mean.	Total.	Max. 24 hours.
	In.	In.	In.	°	°	°	°	°	°	°	°	°	°	°	°					In.	In.
J ..	28.297	29.00	27.69	-16.3	- 6.2	-11.5	-11.3	35	-39	- 0.2	-21.4	-19	-13	-15	-16	84	72	82	80	0.70	0.51
F ..	28.480	29.15	27.90	-12.4	- 0.9	- 5.9	- 6.4	35	-36	2.0	-15.8	-17	- 7	-10	-11	81	75	84	80	0.50	0.19
M .	28.458	29.09	27.80	12.4	25.6	18.9	19.0	52	-23	29.8	8.4	9	18	15	14	85	71	84	80	0.56	0.24
A ..	28.290	28.68	27.66	30.2	45.7	37.6	37.8	84	1	48.9	27.4	26	31	31	29	85	58	76	73	0.63	0.28
M	28.283	28.91	27.83	48.6	66.3	56.2	57.0	90	29	69.8	45.2	42	42	44	43	80	46	66	64	1.57	0.75
J ..	28.304	28.63	28.04	58.4	73.7	64.7	65.6	91	35	77.0	54.4	53	53	55	54	84	50	70	68	5.57	2.55
J ..	28.371	28.55	28.13	59.5	73.6	65.9	66.3	90	44	75.6	56.4	55	59	59	58	86	61	78	75	4.62	1.55
A ..	28.382	28.64	27.99	54.9	69.5	60.8	61.7	84	37	71.2	51.8	51	54	55	53	87	60	80	76	2.36	1.32
S ..	28.408	28.85	27.83	47.2	64.3	53.9	55.1	81	26	66.6	43.6	43	46	46	45	85	54	75	71	0.59	0.35
O ..	28.398	28.91	27.73	29.4	44.8	37.0	37.1	68	1	47.2	27.0	25	29	29	28	85	56	75	72	0.98	0.66
N ..	28.393	29.01	27.78	18.5	32.0	22.0	24.2	70	-23	35.7	13.7	14	20	16	17	84	64	79	76	0.40	0.24
D ..	28.406	29.05	27.84	0.1	7.5	1.8	3.1	41	-36	13.7	- 7.5	- 2	4	-1	0	90	85	90	88	0.87	0.28
Y ..	28.372	29.15	27.66	27.5	41.3	33.4	34.1	91	-39	44.8	23.6	23	28	26	26	85	63	78	75	19.35	.....

FRESNO, CAL.

[Latitude, 36° 43′ N.; longitude, 119° 49′ W.]

J ..	.....	.....	.....	.....	.....	.....	.....	.....	...	.....	.....	...	...	...	...	...	...	...	...	.....	.....
F ..	.....	.....	.....	.....	.....	.....	.....	.....	...	.....	.....	...	...	...	...	...	...	...	...	.....	.....
M .	.....	.....	.....	.....	.....	.....	.....	.....	...	.....	.....	...	...	...	...	...	...	...	...	.....	.....
A ..	.....	.....	.....	.....	.....	.....	.....	.....	...	.....	.....	...	...	...	...	...	...	...	...	.....	.....
M .	.....	.....	.....	.....	.....	.....	.....	.....	...	.....	.....	...	...	...	...	...	...	...	...	.....	.....
J ..	.....	.....	.....	.....	.....	.....	.....	.....	...	.....	.....	...	...	...	...	...	...	...	...	.....	.....
J ..	.....	.....	.....	.....	.....	.....	.....	.....	...	.....	.....	...	...	...	...	...	...	...	...	.....	.....
A ..	29.452	29.56	29.34	62.0	89.8	84.8	78.9	103	50	94.8	58.5	48	51	45	48	60	29	25	38	0.00	0.00
S ..	29.553	29.73	29.34	59.9	85.9	79.8	75.2	104	47	92.4	56.8	50	55	52	52	70	37	41	49	0.49	0.49
O ..	29.638	29.89	29.33	54.6	79.0	71.9	68.5	100	40	84.5	51.0	43	51	48	48	66	40	44	50	0.15	0.15
N ..	29.718	29.97	29.40	45.2	64.6	59.1	56.3	80	31	69.4	42.0	40	46	44	44	82	52	60	65	0.32	0.16
D ..	29.831	30.03	29.35	38.9	51.8	48.2	46.3	62	27	55.9	35.6	36	42	41	39	88	70	77	78	1.16	0.57
Y ..	.....	.....	.....	.....	.....	.....	.....	.....	...	.....	.....	...	...	...	...	...	...	...	...	.....	.....

FRISCO, UTAH.

[Latitude, 38° 25′ N.; longitude, 113° 16′ W.]

J ..	23.683	23.98	23.35	27.5	37.0	31.1	31.9	52	11	41.4	22.6	16	17	18	17	63	46	59	56	0.15	0.10
F ..	23.571	24.06	23.31	24.1	32.7	28.4	28.4	55	8	36.8	20.7	16	17	18	17	72	55	65	64	0.86	0.59
M .	23.780	23.98	23.46	39.5	50.8	45.1	45.1	67	26	54.7	36.4	21	22	22	21	49	34	42	41	0.46	0.38
A ..	23.643	23.87	23.31	38.3	48.6	44.0	43.6	72	21	54.0	34.3	24	26	26	25	60	47	54	54	1.53	1.00
M .	23.700	23.94	23.41	48.5	62.4	57.7	56.2	82	24	66.1	45.1	29	28	29	29	50	30	37	39	0.19	0.17
J ..	23.665	24.00	23.35	59.1	72.7	68.5	66.8	89	42	76.3	54.9	34	34	32	33	40	25	27	30	0.02	0.01
J ..	23.811	23.94	23.69	66.3	77.2	73.2	72.2	90	51	81.7	62.1	35	36	34	35	36	27	29	31	1.34	0.50
A ..	23.729	23.89	23.54	63.4	75.9	70.5	69.9	86	37	79.4	60.2	33	34	32	33	35	24	27	29	0.54	0.44
S ..	23.784	23.94	23.47	57.2	69.7	64.4	63.8	81	37	73.2	52.2	28	29	28	28	36	24	27	29	0.28	0.28
O ..	23.795	24.08	23.28	45.0	56.7	50.2	50.6	80	24	60.7	39.7	24	25	24	24	46	33	39	39	0.58	0.49
N ..	23.754	23.94	23.31	38.6	48.0	42.2	42.9	64	7	50.9	33.3	18	20	19	19	47	38	42	42	0.39	0.34
D ..	23.692	23.96	23.22	26.1	30.9	25.8	26.6	44	0	33.9	16.3	14	18	16	16	69	60	67	65	0.76	0.31
Y ..	23.717	24.08	23.22	44.2	55.2	50.1	49.8	90	0	59.1	39.8	24	26	25	25	50	37	43	43	7.10	.....

GALVESTON, TEX.

[Latitude, 29° 18′ N.; longitude, 94° 47′ W.]

J ..	30.124	30.56	29.75	49.0	53.5	51.2	51.2	75	24	57.6	44.5	43	44	44	44	82	74	78	78	1.19	0.42
F ..	30.120	30.57	29.66	60.9	65.5	62.4	62.9	75	47	68.5	57.8	58	58	57	57	90	78	84	84	1.86	0.97
M .	30.051	30.44	29.81	62.3	68.4	64.9	65.2	79	46	70.9	60.3	57	56	56	56	83	65	75	75	1.98	1.47
A ..	30.024	30.26	29.60	66.8	72.4	69.0	69.4	81	51	74.7	65.0	60	62	62	61	81	70	78	76	0.01	0.01
M	29.962	30.10	29.74	73.4	79.0	75.2	75.9	87	57	81.4	70.7	68	68	69	68	84	70	80	78	4.84	1.64
J ..	29.915	30.06	29.73	77.6	83.0	79.2	79.9	88	68	85.3	75.0	71	72	71	71	81	69	76	76	8.28	4.33
J ..	30.009	30.17	29.88	80.5	86.0	82.2	82.9	93	67	88.4	78.1	74	74	73	74	80	67	75	74	1.62	0.49
A ..	29.932	30.04	29.80	80.6	86.1	82.6	83.1	91	71	88.8	77.5	74	73	74	74	79	66	76	74	6.43	2.65
S ..	29.971	30.09	26.69	76.7	82.8	79.5	79.7	88	57	84.7	74.3	70	70	70	70	80	66	72	73	2.52	1.00
O ..	30.022	30.30	29.70	66.5	72.4	69.4	69.4	84	48	74.6	64.1	59	59	60	59	77	65	73	72	4.37	3.24
N ..	30.099	30.42	29.94	60.6	67.4	63.9	64.0	76	37	70.1	57.8	54	52	54	54	81	60	72	71	0.05	0.04
D ..	30.046	30.54	29.60	50.5	55.6	53.7	53.3	74	29	58.8	47.4	46	48	48	48	87	78	81	82	10.28	2.90
Y ..	30.023	30.57	29.60	67.1	72.7	69.4	69.7	93	24	75.3	64.4	61	61	62	61	82	69	77	76	43.43	.....

Monthly and yearly meteorological summaries—Continued.

FORT TOTTEN, D. T.

[H=1,487. T=15. h=4.]

Cloudiness (in tenths).				Wind.													Number of days—										
7 a. m.	8 p. m.	10 p. m.	Mean.	Total (miles).	Maximum.	Direction.	Prevailing direction.	North.	Northeast.	East.	Southeast.	South.	Southwest.	West.	Northwest.	Calms.	Clear.	Fair.	Cloudy.	Foggy.	Rain or snow.	Max. below 32°.	Min. below 32°.	Max. above 90°.	Thunder-storms.	Auroras.	Months and year.
5.6	4.4	2.8	4.6	9,755	60	NW.	NW.	12	6	7	4	7	11	16	24	6	11	11	9	0	8	30	31	0	0	3	J.
4.8	5.4	2.4	4.2	8,223	48	S.	NW.	10	2	5	10	12	6	8	27	4	10	14	4	0	7	27	28	0	0	11	F.
4.9	5.9	3.6	4.8	10,882	64	NW.	NW.	12	7	4	14	11	9	7	23	6	6	21	4	0	8	14	30	0	0	2	M.
5.4	5.7	5.1	5.4	10,308	42	S.	N.	27	13	7	6	14	0	4	17	2	7	14	9	0	10	3	21	0	1	8	A.
4.1	4.5	3.6	4.1	10,960	52	S.	N.	18	7	6	7	12	12	10	14	7	12	15	4	0	13	0	4	0	2	6	M.
3.3	4.4	3.9	3.9	11,457	54	NW.	NW.	7	9	6	16	17	5	11	18	1	11	14	5	0	11	0	0	2	7	3	J.
3.9	4.5	4.1	4.2	7,816	60	W.	N.	23	17	12	6	7	9	4	14	1	13	12	6	0	14	0	0	1	6	1	J.
5.5	5.4	4.6	5.2	8,024	54	W.	SE.	11	13	13	24	16	5	4	7	0	8	17	6	0	9	0	0	0	4	2	A.
4.1	4.4	2.3	3.6	10,906	50	W.	S.	14	5	5	11	22	11	7	15	0	12	15	3	0	5	0	3	0	0	5	S.
4.9	5.3	5.0	5.1	10,297	48	NW.	NW.	15	6	3	7	8	11	13	30	0	9	13	9	0	6	2	10	0	0	1	O.
3.4	5.4	3.6	4.1	9,023	45	NW.	W.	12	2	5	7	7	10	26	21	0	12	10	8	0	5	12	25	0	0	2	N.
4.3	5.2	4.1	4.5	10,397	42	NW.	NW.	24	8	8	8	8	6	3	27	1	9	17	5	0	10	26	31	0	0	1	D.
4.5	5.0	3.8	4.4	118,048	..	.....	NW.	185	95	81	120	141	95	113	237	28	120	173	72	0	106	114	192	3	20	40	Y.

FRESNO, CAL.

[H=313. T=46. h=35.]

...	...	...	...	.....	..	.....	.....	...	...	...	...	...	...	...	...	..	...	...	...	...	...	...	...	...	...	...	J.
...	...	...	...	.....	..	.....	.....	...	...	...	...	...	...	...	...	..	...	...	...	...	...	...	...	...	...	...	F.
...	...	...	...	.....	..	.....	.....	...	...	...	...	...	...	...	...	..	...	...	...	...	...	...	...	...	...	...	M.
...	...	...	...	.....	..	.....	.....	...	...	...	...	...	...	...	...	..	...	...	...	...	...	...	...	...	...	...	A.
...	...	...	...	.....	..	.....	.....	...	...	...	...	...	...	...	...	..	...	...	...	...	...	...	...	...	...	...	M.
...	...	...	...	.....	..	.....	.....	...	...	...	...	...	...	...	...	..	...	...	...	...	...	...	...	...	...	...	J.
...	...	...	...	.....	..	.....	.....	...	...	...	...	...	...	...	...	..	...	...	...	...	...	...	...	...	...	...	J.
0.0	0.0	0.0	0.0	1,876	22	W.	NW.	1	1	0	1	3	5	9	28	0	16	0	0	0	0	0	0	13	0	0	A.
0.4	1.0	0.8	0.7	3,040	20	S., W.	NW.	4	0	4	6	15	1	14	44	2	28	1	1	0	2	0	0	18	2	0	S.
1.0	1.0	1.1	1.0	2,830	24	NW., S.	NW.	14	1	6	15	13	1	14	19	10	27	2	2	0	1	0	0	6	0	0	O.
1.2	2.5	1.5	1.7	2,266	24	SE.	NW.	8	6	8	10	8	12	3	22	13	23	7	0	0	4	0	1	0	0	0	N.
3.8	4.6	2.2	3.5	2,689	25	S.	N.	18	5	14	14	15	5	7	4	11	14	12	5	0	6	0	11	0	0	0	D.
...	...	...	...	.....	..	.....	.....	...	...	...	...	...	...	...	...	..	...	...	...	...	...	...	...	...	...	...	Y.

FRISCO, UTAH.

[H=6,406. T=38. h=29.]

2.6	4.0	2.2	2.9	7,594	48	SW.	N.	29	4	1	2	7	26	14	8	2	17	11	3	0	4	5	28	0	0	0	J.
4.1	4.2	3.3	3.9	9,670	48	SW.	SW.	7	1	0	1	5	49	7	8	6	10	15	3	0	7	10	26	0	0	0	F.
2.5	2.9	3.0	2.8	7,174	27	SW.	SW.	32	6	0	3	3	33	4	10	2	20	6	5	0	2	0	12	0	0	0	M.
3.0	5.8	3.9	4.2	8,375	44	SW.	N.	35	1	1	1	8	29	4	8	3	11	15	4	0	7	0	15	0	0	0	A.
2.1	3.1	3.2	2.8	9,132	46	SW.	N.	34	5	1	0	12	28	7	5	1	19	11	1	0	2	0	4	0	1	0	M.
0.8	2.0	2.2	1.7	10,109	60	SW.	SW.	19	1	2	0	11	40	12	4	1	23	7	0	0	2	0	0	0	2	0	J.
2.1	3.5	3.7	3.1	7,412	38	SW.	SW	13	4	0	1	7	42	16	9	1	17	11	3	0	8	0	0	0	6	0	J.
1.5	3.5	2.3	2.4	9,090	44	SW.	SW.	7	1	1	1	13	52	17	0	1	19	10	2	0	4	0	0	0	5	0	A.
1.5	2.0	2.1	1.9	7,983	53	SW.	SW.	16	13	1	5	5	38	10	2	0	23	5	2	0	1	0	0	0	0	0	S
2.0	1.7	1.3	1.7	7,466	46	SW.	N.	46	12	0	1	2	19	8	5	0	25	6	0	0	3	0	3	0	1	0	O.
2.6	2.8	2.2	2.5	6,989	35	SW.	SW.	31	4	1	3	8	32	1	6	4	18	10	2	0	3	1	11	0	0	0	N.
2.0	3.8	2.9	2.9	6,795	58	SW.	N.	26	9	0	3	6	20	4	8	17	18	12	1	0	7	10	31	0	0	0	D.
2.2	3.3	2.7	2.7	96,889	..	.....	SW.	295	61	8	21	87	408	104	73	38	220	119	26	0	50	26	130	0	15	0	Y.

GALVESTON, TEX.

[H=40. T=60. h=51.]

3.8	4.0	1.8	3.2	8,207	35	N.	S.	20	12	11	9	31	5	1	2	2	16	11	4	2	8	0	5	0	0	0	J.
6.2	5.9	3.2	5.1	7,857	41	N.	S.	9	11	12	16	27	5	2	1	1	8	13	7	1	5	0	0	0	1	0	F.
3.4	3.2	3.1	3.3	7,753	33	N.	S.	14	10	9	12	34	4	5	2	3	17	9	5	0	5	0	0	0	2	0	M.
3.7	5.1	3.4	4.1	9,056	31	N.	SE.	8	5	5	42	24	3	0	1	2	14	9	7	0	0	0	0	0	0	0	A.
5.2	4.1	2.8	4.0	7,278	28	S.	S.	3	1	8	19	41	7	2	6	6	10	18	3	0	5	0	0	0	6	0	M.
3.5	4.6	2.3	3.5	7,803	39	E.	SE.	2	10	20	29	26	1	0	0	2	14	13	3	0	8	0	0	0	3	0	J.
3.8	3.7	1.9	3.1	6,344	36	E.	S.	1	1	3	3	44	36	3	1	1	16	12	3	0	10	0	0	3	5	0	J.
4.4	4.2	2.1	3.6	6,334	24	NW.	S.	1	3	13	13	36	13	4	4	6	17	11	3	0	12	0	0	7	5	0	A.
4.5	4.9	2.9	4.1	8,046	40	NE.	SE.	1	13	18	25	20	2	4	5	2	16	8	6	0	10	0	0	0	1	0	S.
4.1	4.6	3.8	4.2	8,570	48	N.	N.	31	20	5	16	16	1	1	2	1	13	8	10	0	10	0	0	0	0	0	O.
4.1	4.0	2.1	3.4	3,631	14	N.	S.	20	8	9	5	27	9	3	7	2	14	12	4	0	2	0	0	0	0	0	N.
7.0	6.7	6.2	6.6	8,401	32	N.	N.	23	19	12	12	11	1	2	13	0	7	6	18	0	17	0	2	0	0	0	D.
4.5	4.6	2.9	4.0	89,489	..	S.	S.	133	113	125	201	337	87	27	44	28	162	130	73	3	92	0	7	10	22	0	Y.

Monthly and yearly meteorological summaries—Continued.

GRAND HAVEN, MICH.

[Latitude, 43° 5′ N.; longitude, 86° 18′ W.]

Months and year.	Pressure. Mean.	Pressure. Maximum.	Pressure. Minimum.	Temperature. 7 a. m.	Temperature. 3 p. m.	Temperature. 10 p. m.	Temperature. Mean.	Temperature. Maximum.	Temperature. Minimum.	Temperature. Mean. Maximum.	Temperature. Mean. Minimum.	Dew point. 7 a. m.	Dew point. 3 p. m.	Dew point. 10 p. m.	Dew point. Mean.	Relative humidity. 7 a. m.	Relative humidity. 3 p. m.	Relative humidity. 10 p. m.	Relative humidity. Mean.	Precipitation. Total.	Precipitation. Max. 24 hours.
	In.	In.	In.	°	°	°	°	°	°	°	°	°	°	°	°					In.	In.
J..	29.235	29.79	28.58	20.1	21.7	18.5	20.1	48	-2	26.3	12.4	15	16	14	15	81	79	83	81	4.40	2.68
F..	29.417	30.08	28.42	22.4	25.5	24.4	24.1	46	-7	30.4	17.4	18	19	20	19	83	78	84	82	4.48	1.06
M..	29.379	29.94	28.73	23.7	30.0	28.1	27.3	60	7	35.2	20.4	16	18	18	18	74	64	68	69	0.95	0.41
A..	29.263	29.78	28.55	38.2	47.2	45.2	43.5	73	16	54.3	35.4	30	30	33	31	73	55	65	64	1.09	0.35
M..	29.309	29.62	28.95	56.6	62.6	59.3	59.5	84	42	69.6	51.3	48	47	47	47	74	60	66	66	2.91	1.47
J..	29.310	29.72	28.99	62.2	70.0	66.1	66.1	84	48	74.9	57.6	56	56	55	55	80	62	70	71	0.55	0.46
J..	29.303	29.52	29.05	69.0	75.8	72.5	72.4	90	52	80.6	64.7	63	63	61	62	80	66	68	71	2.94	0.58
A..	29.350	29.60	29.11	60.6	70.1	65.8	65.5	91	46	74.5	58.3	55	57	57	56	82	66	75	74	2.26	0.87
S..	29.423	29.81	28.95	53.2	64.1	58.3	58.5	82	32	67.4	50.7	48	52	51	50	84	66	77	76	4.72	2.15
O..	29.346	29.79	28.71	42.2	48.9	45.6	45.6	76	20	52.7	39.0	35	39	37	37	77	69	74	74	2.78	0.92
N..	29.339	30.12	28.49	33.4	38.7	36.5	36.2	59	13	41.8	30.3	28	29	29	29	81	72	76	76	1.72	0.70
D..	29.324	30.01	28.72	28.3	31.0	29.9	29.7	53	5	34.8	24.1	25	26	25	25	87	83	83	84	3.96	1.00
Y..	29.333	30.12	28.42	42.5	48.8	45.8	45.7	91	-7	53.5	38.5	36	38	37	37	80	68	74	74	32.75	.....

GREEN BAY, WIS.

[Latitude, 44° 31 N.; longitude, 88° 0′ W.]

Months and year.	Pressure. Mean.	Pressure. Maximum.	Pressure. Minimum.	Temperature. 7 a. m.	Temperature. 3 p. m.	Temperature. 10 p. m.	Temperature. Mean.	Temperature. Maximum.	Temperature. Minimum.	Temperature. Mean. Maximum.	Temperature. Mean. Minimum.	Dew point. 7 a. m.	Dew point. 3 p. m.	Dew point. 10 p. m.	Dew point. Mean.	Relative humidity. 7 a. m.	Relative humidity. 3 p. m.	Relative humidity. 10 p. m.	Relative humidity. Mean.	Precipitation. Total.	Precipitation. Max. 24 hours.
J..	29.275	29.86	28.38	3.4	13.3	7.9	8.2	40	-29	17.8	-3.1	0	8	4	4	88	78	85	84	2.51	0.77
F..	29.444	30.20	28.48	10.5	21.9	16.8	16.4	44	-17	25.3	6.0	8	18	14	13	91	84	88	88	3.99	1.18
M..	29.420	30.06	28.84	18.7	29.4	23.4	23.8	46	-7	32.0	14.7	16	22	20	19	88	75	85	82	1.01	0.45
A..	29.252	29.76	28.58	36.0	47.3	39.5	40.9	74	16	50.7	31.6	30	31	33	31	80	58	78	71	1.76	0.50
M..	29.301	29.64	28.88	57.7	69.9	58.3	62.0	86	38	72.8	51.2	48	48	48	48	71	48	71	63	0.90	0.43
J..	29.308	29.69	28.96	62.2	75.2	64.2	67.2	90	43	77.3	56.4	55	58	57	56	78	58	78	71	2.38	0.66
J..	29.290	29.50	28.98	68.6	82.4	71.4	74.1	98	46	84.4	63.6	62	60	60	62	78	50	70	66	4.31	2.29
A..	29.354	29.57	29.12	60.5	72.8	64.4	65.9	93	42	74.9	56.7	55	55	55	55	83	55	74	71	2.93	0.81
S..	29.422	29.81	28.98	53.0	64.2	56.1	57.8	82	31	65.9	49.2	49	51	50	50	87	61	81	77	3.29	1.32
O..	29.337	29.80	28.75	38.9	48.8	41.6	43.1	74	8	50.9	34.8	34	35	35	34	82	61	78	74	3.90	1.28
N..	29.358	30.18	28.53	28.8	37.0	31.1	32.3	64	-12	39.6	23.8	23	26	24	24	79	68	76	74	1.57	0.61
D..	29.336	29.94	28.63	21.7	26.1	24.0	23.9	47	-17	29.4	17.8	18	22	21	20	88	85	88	87	4.01	0.62
Y.	29.341	30.20	28.38	38.3	49.0	41.6	43.0	98	-29	51.8	33.6	33	36	35	35	83	65	79	76	32.56	.....

HATTERAS, N. C.

[Latitude, 35° 15′ N.; longitude, 75° 40′ W.]

Months and year.	Pressure. Mean.	Pressure. Maximum.	Pressure. Minimum.	Temperature. 7 a. m.	Temperature. 3 p. m.	Temperature. 10 p. m.	Temperature. Mean.	Temperature. Maximum.	Temperature. Minimum.	Temperature. Mean. Maximum.	Temperature. Mean. Minimum.	Dew point. 7 a. m.	Dew point. 3 p. m.	Dew point. 10 p. m.	Dew point. Mean.	Relative humidity. 7 a. m.	Relative humidity. 3 p. m.	Relative humidity. 10 p. m.	Relative humidity. Mean.	Precipitation. Total.	Precipitation. Max. 24 hours.
J..	30.134	30.60	29.65	42.7	47.6	43.9	44.7	66	20	52.1	36.8	38	40	39	39	85	77	84	82	6.09	1.50
F..	30.257	30.74	29.76	49.8	53.2	51.0	51.3	67	33	58.8	45.5	45	47	47	46	86	80	86	84	1.37	0.52
M..	29.991	30.54	29.52	46.5	52.4	49.4	49.4	69	32	56.3	42.8	39	43	43	42	77	72	79	76	3.04	0.88
A..	30.060	30.57	29.53	55.1	60.3	55.7	57.0	76	37	64.5	50.4	49	50	50	50	82	70	83	78	2.71	1.45
M..	30.053	30.36	29.63	68.6	71.5	67.1	69.1	78	55	74.1	64.1	61	61	62	61	77	72	84	78	2.58	1.03
J..	30.028	30.32	29.76	71.9	74.3	71.1	72.4	82	60	77.1	68.7	67	67	67	67	84	80	87	84	3.41	1.64
J..	30.045	30.27	29.86	78.2	81.0	77.6	78.9	89	70	83.7	75.0	74	74	74	74	87	81	89	86	6.18	2.04
A..	29.990	30.20	29.15	75.4	78.5	75.5	76.5	85	65	80.8	72.2	70	70	70	70	84	76	83	81	7.99	2.50
S..	30.130	30.34	29.74	69.4	73.9	69.5	70.9	84	53	76.3	66.2	63	64	63	63	81	70	80	77	0.80	0.42
O..	30.042	30.37	29.52	63.3	67.7	64.4	65.1	80	42	71.4	60.4	58	59	59	59	84	76	84	81	11.07	3.94
N..	30.125	30.54	29.62	52.2	56.9	53.5	54.2	73	39	62.4	47.7	46	48	48	47	80	72	81	78	2.87	1.80
D..	30.143	30.60	29.30	45.9	50.2	47.5	47.9	65	24	57.1	43.1	43	46	44	44	90	86	87	88	6.96	3.20
Y..	30.083	30.74	29.15	59.9	64.0	60.5	61.5	89	20	67.9	56.1	55	56	55	55	83	76	84	81	55.07	.....

HELENA, MONT.

[Latitude, 46° 34′ N.; longitude, 112° 4′ W.]

Months and year.	Pressure. Mean.	Pressure. Maximum.	Pressure. Minimum.	Temperature. 7 a. m.	Temperature. 3 p. m.	Temperature. 10 p. m.	Temperature. Mean.	Temperature. Maximum.	Temperature. Minimum.	Temperature. Mean. Maximum.	Temperature. Mean. Minimum.	Dew point. 7 a. m.	Dew point. 3 p. m.	Dew point. 10 p. m.	Dew point. Mean.	Relative humidity. 7 a. m.	Relative humidity. 3 p. m.	Relative humidity. 10 p. m.	Relative humidity. Mean.	Precipitation. Total.	Precipitation. Max. 24 hours.
J..	25.620	26.15	25.08	17.9	23.1	20.7	20.6	48	-25	30.9	10.9	11	15	13	13	75	71	72	73	1.35	0.42
F..	25.723	26.04	25.21	1.0	8.3	5.8	5.0	61	-40	13.8	-5.0	-4	3	0	-0	80	78	78	79	0.61	0.28
M..	25.802	26.21	25.39	35.4	44.3	41.1	40.3	67	4	50.2	29.8	29	33	32	31	77	66	70	71	0.12	0.04
A..	25.738	26.12	25.40	36.9	47.5	42.8	42.4	74	22	52.2	33.2	31	33	34	33	79	60	72	70	1.93	0.78
M..	25.809	26.22	25.40	43.1	57.9	53.6	51.5	88	31	64.7	39.8	38	45	43	42	83	64	72	73	2.41	0.76
J..	25.773	26.16	25.44	49.4	64.3	59.1	57.6	83	33	69.2	45.8	45	52	50	49	84	65	75	75	3.48	1.06
J..	25.895	26.08	25.68	56.5	74.2	69.0	66.6	92	44	79.2	53.2	46	50	48	48	68	45	50	54	0.27	0.10
A..	25.850	26.10	25.60	55.3	69.4	64.3	63.0	87	40	74.5	49.8	42	41	41	41	63	39	48	50	1.86	0.66
S..	25.865	26.10	25.55	46.2	63.1	58.7	56.0	81	32	69.1	43.8	32	36	37	35	59	39	48	49	0.50	0.37
O..	25.934	26.25	25.39	36.6	47.7	44.3	42.9	74	3	53.9	31.0	23	27	27	26	59	49	53	54	1.01	0.44
N..	25.858	26.09	25.46	29.5	38.1	34.2	33.9	66	-11	43.6	24.9	17	22	20	20	59	55	58	57	0.22	0.18
D..	25.779	26.26	25.33	20.9	24.4	23.7	23.0	54	-13	31.0	14.9	10	12	12	11	64	62	62	62	0.29	0.12
Y..	25.804	26.26	25.08	35.7	46.9	43.1	41.9	92	-40	52.7	31.0	27	31	30	29	71	58	63	64	14.06	....

Monthly and yearly meteorological summaries—Continued.

GRAND HAVEN, MICH.

[H=620. T=86. h=75.]

Cloudiness (in tenths).				Wind.													Number of days—										
7 a. m.	3 p. m.	10 p. m.	Mean.	Total (miles).	Maximum.	Direction.	Prevailing direction.	North.	Northeast.	East.	Southeast.	South.	Southwest.	West.	Northwest.	Calms.	Clear.	Fair.	Cloudy.	Foggy.	Rain or snow.	Max. below 32°.	Min. below 32°.	Max. above 90°.	Thunder-storms.	Auroras.	Months and year.
8.0	8.6	8.0	8.2	10,413	40	NW.	SW.	11	11	12	10	11	15	12	11	0	0	10	21	0	21	22	31	0	0	0	J.
7.8	8.4	7.3	7.8	8,671	59	W.	E.	5	9	22	11	5	6	14	11	1	1	10	17	0	20	13	27	0	2	0	F.
6.1	6.4	4.2	5.6	8,326	35	NW.	N.	29	9	10	9	9	4	6	16	1	4	21	6	0	6	13	30	0	0	0	M.
6.4	6.2	5.6	6.1	9,576	44	W.	S.	1	7	14	10	26	12	6	14	0	2	19	9	0	13	1	9	0	3	0	A.
3.9	3.9	2.0	3.6	6,385	39	S.	W.	5	5	14	11	15	8	19	16	0	13	13	5	0	10	0	0	0	3	2	M.
6.1	5.5	5.9	5.8	5,806	24	S., NW.	W.	3	6	11	9	13	13	21	13	1	6	13	11	0	4	0	0	0	0	0	J.
4.6	4.3	2.4	3.8	6,670	24	S., SE., S., NW., S, SW, S	S., NW	3	6	13	5	23	10	10	23	0	12	15	4	0	8	0	0	0	7	0	J.
4.3	5.6	5.0	5.0	5,334	36	NW.	NW.	8	11	10	14	7	6	9	25	3	9	13	9	0	6	0	0	1	3	0	A.
5.2	6.0	4.4	5.2	6,334	33	NW.	E.	6	7	22	15	10	6	6	17	1	11	9	10	1	13	0	1	0	5	0	S.
6.4	6.0	6.4	6.3	9,952	54	SW.	NW.	8	4	5	16	17	8	9	26	0	4	16	11	0	15	1	6	0	3	0	O.
6.6	7.0	6.0	6.5	9,944	42	NW.	NW.	4	12	17	5	11	12	10	19	0	8	8	14	0	10	4	16	0	0	0	N.
8.8	9.4	8.8	9.0	9,568	40	W.	SW.	7	5	13	20	7	21	9	11	0	1	4	26	0	23	12	23	0	0	0	D.
6.2	6.4	5.6	6.1	96,979	..	.....	NW.	90	92	163	135	154	121	131	202	7	71	151	143	1	149	66	143	1	26	2	Y.

GREEN BAY, WIS.

[H=616. T=49. h=42.]

6.0	6.5	5.4	6.0	6,659	36	NE.	SW.	14	17	1	0	17	24	8	11	1	5	16	10	0	15	25	31	0	0	0	J.
6.2	6.8	5.4	6.1	6,122	30	NE.	SW.	11	16	3	6	8	23	5	11	1	7	8	13	0	15	20	28	0	0	0	F.
4.6	6.3	3.5	4.8	5,571	28	N.	NE.	19	26	7	8	9	17	2	4	1	7	19	5	0	4	14	30	0	0	0	M.
6.2	7.0	6.3	6.5	6,978	32	NW.	SW.	5	17	9	6	15	21	6	11	0	4	11	15	0	10	0	17	0	2	0	A.
4.2	4.5	3.2	4.0	5,999	41	SW.	S., SW.	7	18	7	10	19	19	6	3	4	13	11	7	0	9	0	0	0	1	0	M.
5.1	6.7	4.2	5.3	5,011	25	N.	S.	6	16	3	8	19	17	16	3	2	8	13	9	0	13	0	0	2	2	0	J.
4.5	6.3	4.2	5.0	4,859	36	NE.	SW.	4	18	5	3	17	24	13	5	4	9	14	8	0	8	0	0	6	6	1	J.
5.8	7.6	5.4	6.3	4,425	33	NE.	NE.	9	20	10	4	18	15	6	11	0	3	18	10	0	8	0	0	2	2	0	A.
6.6	6.2	4.5	5.8	5,318	30	W.	SW.	16	10	10	9	13	22	9	1	0	7	12	11	0	14	0	1	0	1	0	S.
6.1	6.9	4.8	5.9	6,969	36	SW.	SW.	8	8	3	3	9	28	11	23	0	5	19	7	0	13	1	11	0	2	0	O.
7.2	6.3	5.0	6.2	6,440	36	N.	SW.	16	18	5	2	5	23	10	11	0	5	14	11	0	6	6	21	0	0	0	N.
8.8	8.7	7.1	8.2	6,512	36	W.	SW.	15	18	2	4	11	27	10	5	1	1	10	20	0	23	16	28	0	0	0	D.
5.9	6.6	4.9	5.8	70,863	..	.....	SW.	130	202	65	63	160	260	102	99	14	74	165	126	0	138	82	170	10	16	1	Y.

HATTERAS, N. C.

[H=11. T=17. h=2.]

5.3	5.0	4.4	4.9	11,269	41	W.	N.	27	0	0	2	10	24	15	14	1	11	11	9	0	15	0	9	0	1	0	J.
5.3	6.1	4.1	5.2	9,011	39	NW.	N.	30	7	1	3	8	14	11	10	0	9	9	10	0	8	0	0	0	0	0	F.
5.1	3.6	2.8	3.8	10,777	39	SW.	N.	30	8	1	3	2	22	14	12	1	12	15	4	0	8	0	1	0	3	0	M.
4.9	3.9	2.1	3.6	11,666	47	W.	NE.	14	23	5	3	9	19	10	7	0	12	14	4	0	9	0	0	0	3	0	A.
3.7	3.9	2.3	3.3	8,243	43	W.	S.	16	8	13	8	29	12	6	0	1	16	10	5	0	10	0	0	0	7	0	M.
5.1	4.2	4.1	4.5	10,589	42	N.	N.	21	18	2	4	17	20	5	0	0	11	11	8	0	9	0	0	0	5	0	J.
4.9	5.4	3.6	4.6	8,140	42	N.	S.	2	0	4	9	34	33	8	2	1	9	14	8	0	13	0	0	0	7	0	J.
4.7	4.0	3.5	4.1	9,868	82	SE.	N.	19	17	5	11	17	15	4	5	0	15	10	6	0	12	0	0	0	3	0	A.
3.7	3.5	2.4	3.2	8,458	46	N.	NE.	20	22	10	10	10	10	4	4	0	19	9	2	0	3	0	0	0	0	0	S.
5.0	5.6	3.8	4.8	10,177	54	N.	N.	29	13	5	4	9	12	7	13	1	16	3	12	0	12	0	0	0	2	0	O.
4.0	4.2	3.0	3.7	10,570	47	N.	N.	27	3	7	6	4	12	8	21	2	15	7	8	0	8	0	0	0	0	0	N.
6.4	6.5	4.7	5.9	10,798	48	W.	N.	29	11	7	10	2	3	12	19	0	6	13	12	0	12	0	3	0	1	0	D.
4.8	4.7	3.4	4.3	119,566	..	.....	N.	267	130	60	73	151	196	104	107	7	151	126	88	0	119	0	13	0	32	0	Y.

HELENA, MONT.

[H=4,069. T=64. h=51.]

7.4	7.1	7.3	7.3	6,973	40	W.	SW.	13	6	1	0	3	42	16	12	0	3	13	15	0	17	12	31	0	0	0	J.
4.9	6.6	4.9	5.5	3,282	30	W.	SW.	16	8	1	0	0	26	5	13	15	6	13	9	0	13	24	26	0	0	0	F.
6.4	5.5	3.9	5.3	7,168	36	SW.	SW.	8	3	0	1	1	38	25	17	0	5	20	6	0	5	1	17	0	0	0	M.
7.2	7.8	6.8	7.3	5,865	40	W.	SW.	6	5	1	1	3	36	20	17	1	1	14	15	0	9	0	15	0	0	0	A.
3.8	4.4	4.7	4.3	6,084	30	W.	SW.	6	6	2	4	0	40	22	13	0	12	13	6	0	9	0	4	0	0	0	M.
5.1	5.2	5.3	5.2	5,235	40	NW.	SW.	8	11	7	2	2	35	12	13	0	6	18	6	0	13	0	0	0	3	0	J.
2.3	2.7	3.0	2.7	5,258	36	NW., SW.,	SW.	11	6	2	5	1	43	8	17	0	18	12	1	0	3	0	0	1	0	0	J.
4.3	4.1	5.0	4.5	4,361	35	SW.	SW.	8	18	5	2	4	22	12	19	3	7	19	5	0	12	0	0	0	3	0	A.
2.5	3.2	3.1	2.9	4,886	30	SW.	SW.	6	11	2	3	0	29	15	22	2	19	8	3	0	5	0	1	0	0	0	S.
4.3	3.9	3.3	3.8	5,356	35	SW.	SW.	8	12	2	1	0	28	17	25	0	12	14	5	0	7	2	17	0	0	0	O.
3.5	5.1	2.9	3.8	4,443	34	NW., W.	NW.	9	12	1	0	3	7	23	32	3	12	14	4	0	2	8	16	0	0	0	N.
5.6	8.5	5.4	6.5	4,238	36	SW.	SW.	14	4	1	0	8	33	15	10	8	1	19	11	0	4	12	26	0	0	0	D.
4.8	5.3	4.6	4.9	63,149	..	.....	SW.	113	102	25	19	25	329	190	210	32	102	177	86	0	99	59	153	1	6	0	Y.

Monthly and yearly meteorological summaries—Continued.

HURON, DAK.

[Latitude, 44° 21′ N.; longitude, 98° 9′ W.]

Months and year.	Pressure. Mean.	Pressure. Maximum.	Pressure. Minimum.	Temperature. 7 a. m.	Temperature. 3 p. m.	Temperature. 10 p. m.	Temperature. Mean.	Temperature. Maximum.	Temperature. Minimum.	Temperature. Mean. Maximum.	Temperature. Mean. Minimum.	Dew point. 7 a. m.	Dew point. 3 p. m.	Dew point. 10 p. m.	Dew point. Mean.	Relative humidity. 7 a. m.	Relative humidity. 3 p. m.	Relative humidity. 10 p. m.	Relative humidity. Mean.	Precipitation. Total.	Precipitation. Max. 24 hours.
	In.	In.	In.	°	°	°	°	°	°	°	°	°	°	°	°					In	In.
J..	28.566	29.28	27.64	-5.8	6.1	-1.4	-0.4	38	-43	12.9	-12.8	-10	-1	-8	-6	83	71	76	76	0.33	0.14
F..	28.727	29.37	28.03	-2.7	9.6	3.8	3.6	47	-60	14.4	-7.2	-7	3	-1	-2	83	74	80	79	1.11	0.45
M.	28.695	29.32	28.10	23.6	37.4	30.4	30.5	68	-4	42.5	21.1	19	24	24	22	82	62	78	74	0.64	0.29
A..	28.486	28.90	27.90	37.4	56.2	47.7	47.1	94	16	60.5	35.1	30	32	35	32	74	45	65	61	3.72	1.77
M..	28.521	29.06	27.81	50.7	73.1	62.4	62.1	92	32	76.8	47.6	43	42	46	44	76	38	57	57	1.39	0.69
J..	28.526	28.76	28.24	61.4	78.7	69.7	69.9	97	38	81.5	58.1	56	55	57	56	83	47	66	66	3.08	1.30
J..	28.571	28.77	28.32	62.3	81.6	72.0	72.0	99	44	84.5	59.4	57	57	60	58	83	46	68	65	4.96	1.94
A..	28.582	28.83	28.24	57.4	73.7	65.5	65.5	91	40	76.5	56.2	53	55	58	55	85	55	77	72	6.13	1.97
S..	28.647	29.05	28.14	50.5	69.7	58.6	59.6	89	26	73.0	48.7	45	48	48	47	82	49	70	67	0.15	0.11
O..	28.645	29.18	28.12	32.5	53.5	40.7	42.2	78	5	55.9	29.9	26	27	30	28	79	39	67	61	0.79	0.40
N..	28.653	29.08	28.12	20.9	41.4	28.9	30.4	76	-28	45.4	17.4	11	20	17	16	67	47	61	58	0.25	0.15
D..	28.638	29.23	28.20	5.7	14.3	9.9	10.0	40	-23	20.2	-0.3	1	6	4	4	82	71	79	77	2.09	0.50
Y..	38.605	29.37	27.64	32.8	49.6	40.7	41.0	99	-43	53.7	29.4	27	31	31	30	80	54	70	68	25.54	.....

INDIANAPOLIS, IND.

[Latitude, 39° 46′ N.; longitude, 86° 10′ W.]

J..	29.191	29.76	28.46	20.8	29.1	23.4	24.4	64	-12	33.6	14.1	17	19	18	18	84	67	79	77	1.48	0.48
F..	29.325	29.87	28.41	31.4	37.1	35.4	34.6	66	10	43.2	26.6	28	29	30	29	89	75	80	81	4.61	1.24
M.	29.232	29.63	28.60	32.3	44.4	37.8	38.2	70	16	47.1	29.8	26	27	28	27	79	53	70	67	2.78	1.89
A..	29.189	29.59	28.58	44.4	60.1	52.4	52.3	85	22	62.9	41.4	36	36	39	37	72	44	62	60	3.92	1.46
M.	29.184	29.45	28.85	60.6	75.2	66.2	67.3	89	49	77.8	56.2	54	54	57	55	78	50	74	67	2.39	0.96
J..	29.202	29.51	28.93	66.9	81.5	73.1	73.8	94	49	83.6	61.9	57	56	58	57	73	44	61	59	2.45	1.22
J..	29.185	29.34	28.95	72.4	90.0	79.5	80.6	101	59	91.8	68.5	63	60	62	62	74	38	58	57	1.41	0.54
A..	29.204	29.44	28.97	64.7	82.3	72.8	73.3	90	49	83.9	62.2	56	54	56	56	76	42	58	59	3.15	1.75
S..	29.279	29.56	28.98	58.5	73.6	65.2	65.8	93	34	76.0	55.7	52	51	52	52	80	50	65	65	2.11	0.66
O..	29.276	29.63	28.88	42.6	58.3	49.8	50.2	82	22	60.2	39.6	35	34	36	35	74	43	61	59	0.55	0.16
N..	29.274	29.90	28.65	34.3	47.7	39.6	40.5	74	4	50.7	30.1	27	26	26	26	71	48	63	61	3.71	1.21
D..	29.265	29.86	28.70	27.0	34.5	30.9	30.8	57	-3	37.6	23.2	22	26	25	24	84	72	81	79	4.52	1.62
Y..	29.234	29.90	28.41	46.3	59.5	52.2	52.7	101	-12	62.4	42.4	39	39	41	40	78	52	68	66	33.08	.....

JACKSONVILLE, FLA.

[Latitude, 30° 20′ N.; longitude, 81° 39′ W.]

J..	30.142	30.47	29.75	43.7	57.2	48.6	49.8	76	22	59.8	40.9	41	47	44	44	91	71	85	82	4.34	2.18
F..	30.205	30.54	29.84	58.5	72.3	62.3	64.4	84	38	75.3	57.0	56	60	60	58	93	66	91	84	0.84	0.20
M.	30.022	30.41	29.65	52.9	67.2	58.4	59.5	80	36	69.9	50.5	48	51	52	50	83	60	80	74	3.51	2.04
A..	30.041	30.32	29.66	62.2	73.8	65.1	67.0	89	38	77.3	58.2	58	56	57	57	85	57	78	73	4.15	1.66
M	29.977	30.25	29.75	69.7	79.9	71.1	73.6	91	55	83.0	65.2	64	62	65	64	82	57	82	74	7.15	2.72
J..	29.977	30.16	29.79	74.7	84.1	74.9	77.9	95	64	87.1	70.4	70	67	69	69	84	59	84	76	9.68	3.01
J..	30.000	30.12	29.80	78.3	87.8	79.2	81.8	100	69	91.3	74.3	74	72	73	73	86	61	82	76	8.90	2.88
A..	29.926	30.08	29.63	76.6	86.7	79.1	80.8	97	68	90.1	73.5	73	73	74	73	88	65	83	79	5.76	1.96
S..	30.023	30.15	29.81	71.6	81.6	75.0	76.1	95	55	84.2	68.9	69	70	69	69	90	69	83	80	9.40	3.88
O..	29.982	30.16	29.77	65.9	75.4	69.1	70.1	88	40	77.7	63.5	62	64	63	63	88	69	82	80	1.57	0.66
N..	30.081	30.38	29.74	54.5	68.8	59.3	60.9	78	26	70.4	51.3	50	56	55	54	86	64	87	79	0.10	0.02
D..	30.078	30.46	29.48	51.4	60.9	54.4	55.6	76	31	64.3	47.0	48	53	51	51	89	76	90	85	3.70	1.47
Y..	30.038	30.54	29.48	63.3	74.6	66.4	68.1	100	22	77.5	60.1	59	61	61	60	87	64	84	78	58.60	.....

KEELER, CAL.

[Latitude, 36° 35′ N.; longitude, 117° 50′ W.]

J..	26.393	26.64	26.01	37.5	46.6	45.1	43.1	64	25	54.3	32.2	23	25	19	22	57	45	37	46	T.	T.
F..	26.253	26.77	25.88	35.2	44.1	40.8	40.0	63	22	48.6	31.2	20	20	22	21	57	41	52	50	0.93	0.38
M.	26.392	26.61	26.15	47.7	60.5	61.2	56.5	77	33	69.1	44.4	24	26	19	23	41	28	21	30	0.00	0.00
A..	26.250	26.52	25.90	50.1	62.2	59.8	57.4	81	32	68.0	46.8	29	27	25	27	48	30	31	36	1.14	0.45
M.	26.256	26.57	25.98	57.3	72.8	70.0	66.7	93	37	78.2	54.2	34	36	37	36	43	27	32	34	0.04	0.02
J..	26.169	26.40	25.90	61.2	80.4	77.1	73.9	99	44	86.3	61.2	41	40	44	41	44	24	33	34	T.	T.
J..	26.300	26.46	26.13	72.8	86.6	83.9	81.1	99	61	92.8	68.7	43	44	49	45	37	24	31	31	0.52	0.43
A..	26.202	26.36	26.02	70.7	81.6	83.7	79.7	99	53	91.8	64.9	35	36	36	36	28	18	20	22	0.00	0.00
S..	26.285	26.48	25.87	64.1	76.2	76.6	72.3	92	54	84.4	59.1	38	43	36	39	40	33	26	33	1.08	1.08
O..	26.366	26.65	25.73	56.7	66.8	66.8	63.4	91	45	74.8	51.0	36	37	31	34	47	36	31	38	0.84	0.74
N..	26.374	26.61	26.04	46.8	55.1	54.7	52.2	70	28	60.9	41.5	28	32	26	29	50	42	36	43	0.01	0.01
D..	26.389	26.66	25.90	37.7	46.8	44.3	42.9	66	23	52.1	33.6	21	22	19	21	54	42	40	45	0.49	0.37
Y..	26.303	26.77	25.73	53.4	65.2	63.7	60.8	99	22	71.8	49.1	31	32	30	31	46	33	33	37	5.04	.....

Monthly and yearly meteorological summaries—Continued.

HURON. DAK.

[H=1,307. T=48. h=37.]

Cloudiness (in tenths).				Wind.													Number of days—										
7 a. m.	3 p. m.	10 p. m.	Mean.	Total (miles).	Maximum.	Direction.	Prevailing direction.	North.	Northeast.	East.	Southeast.	South.	Southwest.	West.	Northwest.	Calms.	Clear.	Fair.	Cloudy.	Foggy.	Rain or snow.	Max. below 32°.	Min. below 32°.	Max. above 90°.	Thunder-storms.	Aurora.	Months and year.
4.2	4.8	4.0	4.3	5,394	30	SE,NW	NW.	9	4	1	25	8	1	0	36	9	7	20	4	0	8	26	31	0	0	0	J.
5.5	5.0	3.8	4.8	6,015	33	NW.	NW.	4	1	2	24	4	2	1	29	17	11	8	9	0	10	24	28	0	0	0	F.
5.1	5.9	3.4	4.8	5,997	40	NW.	SE.	10	10	2	28	4	1	3	27	8	9	15	7	0	5	0	29	0	0	1	M.
4.9	6.1	5.5	5.5	8,158	48	SW.	NW.	6	15	2	24	6	1	1	30	5	8	14	8	0	15	0	11	1	3	0	A.
2.4	3.8	3.4	3.2	10,158	40	NW.	SE.	15	3	0	37	5	6	2	24	1	17	9	5	0	8	0	0	1	3	0	M.
4.3	5.0	3.7	4.3	8,631	39	NW.	SE.	4	13	5	44	5	2	3	14	0	12	11	7	0	11	0	0	5	9	0	J.
4.4	4.0	3.3	3.9	7,269	66	SE.	SE.	10	11	3	36	5	4	2	22	0	12	15	4	0	12	0	0	5	8	0	J.
4.3	5.6	5.0	5.0	6,600	39	SE.	SE.	11	14	4	38	6	5	2	10	3	8	15	8	0	17	0	0	2	8	0	A.
4.4	4.4	3.5	4.1	7,984	42	SE.	SE.	18	14	5	22	15	4	3	7	2	10	17	3	0	2	0	1	0	0	0	S.
3.5	4.9	3.5	4.0	8,976	38	NW.	NW.	20	3	6	11	14	5	8	24	2	15	10	6	0	7	1	16	0	1	0	O.
2.5	3.9	3.2	3.2	7,166	54	NW.	NW.	7	7	6	18	10	6	6	29	1	15	12	3	0	4	8	27	0	0	1	N.
5.5	5.1	6.2	5.6	8,191	48	N.	NW.	23	6	3	13	14	2	3	27	2	6	16	9	0	15	24	31	0	0	0	D.
4.2	4.9	4.1	4.4	90,539	..	.....	SE.	137	101	39	320	96	39	34	279	50	130	162	73	0	114	89	174	14	32	2	Y.

INDIANAPOLIS, IND.

[H=766. T=76. h=74.]

6.7	6.3	5.7	6.2	5,847	24	W.	S.,SW.	3	7	2	14	20	20	16	11	0	5	15	11	0	13	14	28	0	0	0	A.
8.5	7.8	6.6	7.6	5,187	26	W.,NW	SE., NW.	4	7	13	15	13	5	12	15	0	3	7	18	0	18	4	21	0	3	0	J.
5.6	6.9	5.4	6.0	5,218	31	NW.	NW.	17	10	9	11	6	5	5	28	2	6	15	10	0	7	3	21	0	0	0	F.
5.3	5.8	3.3	4.8	4,974	26	NW.	SW.	3	4	5	14	16	21	13	12	2	8	17	5	0	9	0	6	0	3	0	M.
3.9	6.0	2.9	4.3	3,252	19	NW.	NE.	14	15	13	8	12	8	7	8	8	14	10	7	0	12	0	0	0	12	0	A.
4.7	5.2	3.0	4.3	3,376	17	NW.	SW.	2	10	16	9	5	19	17	9	3	10	13	7	0	7	0	0	7	5	0	M.
3.4	4.8	2.9	3.7	3,093	23	NW.	N.	20	10	3	12	15	15	5	7	6	16	9	6	0	8	0	0	16	9	0	J.
4.6	4.9	3.2	4.2	3,429	30	W.	N., NE.	17	17	16	5	5	7	6	16	4	15	9	7	0	7	0	0	7	5	0	J.
6.0	6.7	3.8	5.5	3,456	20	SW.	E.	16	12	17	14	9	11	6	3	2	6	16	8	6	12	0	0	4	2	0	S.
4.3	5.3	3.8	4.5	4,468	30	W.	N., NW.	17	3	1	10	16	10	15	17	4	12	12	7	0	6	0	7	0	1	0	O.
4.1	5.0	3.7	4.3	4,343	32	NW.	S.	5	3	6	10	25	12	15	10	4	13	12	5	0	8	3	13	0	0	0	N.
6.8	6.9	5.9	6.5	4,590	25	W.	SE.	3	3	10	21	12	15	20	9	0	5	11	15	0	12	7	24	0	0	0	D
5.3	6.0	4.2	5.2	51,233	..	.....	S.	121	10	111	143	154	148	137	145	35	113	146	106	0	119	31	120	34	40	0	Y.

JACKSONVILLE, FLA.

[H=43. T=69. h=59.]

4.8	4.7	3.5	4.3	4,337	30	NW.	NW.	15	2	1	7	10	12	10	20	16	12	12	7	0	17	0	5	0	0	0	J.
3.8	4.5	2.9	3.7	3,559	32	SW.	NE.	9	14	2	7	6	11	7	5	23	17	5	6	0	3	0	0	0	0	0	F.
4.3	3.4	2.3	3.3	2,763	24	N., NW.	SW.	4	10	0	0	10	15	13	9	32	15	12	4	0	4	0	0	0	4	0	M.
2.9	3.4	2.1	2.8	5,173	39	SW.	NE., SW.	3	17	7	6	11	17	10	3	16	20	5	5	0	7	0	0	0	1	0	A.
4.1	5.2	3.2	4.2	5,424	28	S.	S.	3	14	6	19	23	14	8	0	6	11	15	5	0	14	0	0	1	8	0	M.
4.2	6.0	4.2	4.8	4,968	28	S.	NE.	1	27	7	4	16	25	5	0	5	7	17	6	0	15	0	0	9	6	0	J.
3.7	6.9	4.2	4.9	6,560	42	SW.	SW.	1	7	7	9	26	38	3	0	2	9	14	8	0	14	0	0	17	11	0	J.
3.5	5.7	3.8	4.3	5,766	34	SW.	NE.	5	30	8	9	21	12	4	2	2	12	14	5	0	14	0	0	17	8	0	A.
4.3	5.4	2.7	4.1	5,715	24	NE.	NE.	2	58	11	4	8	5	0	1	1	11	14	5	0	13	0	0	4	0	0	S.
4.7	6.5	4.0	5.1	5,823	34	SW.	NE.	17	25	19	2	3	1	14	9	3	12	8	11	0	14	0	0	0	0	0	O.
4.5	4.8	2.5	3.9	4,997	24	W., SW., N.	NE.	19	29	10	1	3	10	13	5	0	10	14	6	0	7	0	2	0	0	0	N.
6.6	7.5	5.1	6.4	4,934	36	W.	N.	25	7	7	4	9	5	13	11	12	3	15	13	0	13	0	1	0	0	0	D.
4.3	5.3	3.4	4.3	60,019	..	.....	NE.	104	240	85	72	146	165	100	65	118	139	145	81	0	135	0	8	48	38	0	Y.

KEELER, CAL.

[H=3,622. T=20. h=2.]

1.7	2.9	1.0	1.9	3,138	25	NW.	SW.	13	6	17	6	6	20	3	6	16	22	8	1	0	0	0	14	0	0	0	J.
2.7	4.1	3.6	3.5	5,615	35	SW.	S.	9	0	8	10	14	13	7	10	13	16	7	5	0	7	0	17	0	0	0	F.
1.4	2.4	1.8	1.9	3,529	29	SE.	SW.	10	10	11	11	9	21	4	5	12	22	9	0	0	0	0	0	0	0	0	M.
2.3	4.1	3.7	3.4	5,499	44	NW.	N.	15	6	14	11	6	14	10	9	5	17	7	6	0	6	0	0	0	1	0	A.
0.9	2.1	2.5	2.2	5,535	34	NW.	SW.	11	11	10	8	9	15	10	12	7	18	12	1	0	3	0	0	3	5	0	M.
1.1	2.0	2.1	1.7	5,964	44	NW.	W.	10	9	3	9	12	9	16	12	10	21	9	0	0	0	0	0	11	1	0	J.
1.8	3.0	1.4	2.1	4,624	32	SE.	S.	10	4	13	8	14	13	8	12	11	21	9	1	0	4	0	0	23	1	0	J.
0.1	0.4	0.5	0.3	4,609	30	SE.	SE.	10	7	11	18	10	14	13	3	7	30	1	0	0	0	0	0	26	0	0	A.
1.3	1.3	0.6	1.1	3,928	40	SE.	E.	2	7	20	11	8	16	9	2	15	25	5	0	0	2	0	0	2	2	0	M.
1.2	1.8	1.5	1.5	4,864	42	NW.	N.	18	6	11	7	5	13	8	7	18	26	3	2	0	2	0	0	3	0	0	O.
2.1	3.7	1.9	2.6	3,113	43	NW.	E.	9	6	15	13	10	11	7	4	15	18	11	1	0	1	0	0	2	0	0	N.
2.1	4.4	2.4	3.0	5,145	40	NW., S.	N.	16	6	12	12	9	6	8	8	16	18	10	3	0	4	0	0	8	0	0	D.
1.6	2.8	1.9	2.1	5,556	..	.....	SW.	133	78	145	124	112	165	103	90	145	254	91	20	0	29	0	41	68	10	0	Y.

Monthly and yearly meteorological summaries—Continued.

KEOKUK, IOWA.

[Latitude, 40° 22′ N.; longitude, 91° 26′ W.]

Months and year.	Pressure.			Temperature.								Dew point.				Relative humidity.				Precipitation.	
										Mean.											
	Mean.	Maximum.	Minimum.	7 a. m.	3 p. m.	10 p. m.	Mean.	Maximum.	Minimum.	Maximum.	Minimum.	7 a. m.	3 p. m.	10 p. m.	Mean.	7 a. m.	3 p. m.	10 p. m.	Mean.	Total.	Max. 24 hours.
	In.	In.	In.	°	°	°	°	°	°	°	°	°	°	°	°					In.	In.
J..	29.352	29.98	28.62	14.7	23.5	19.0	19.1	55	-18	29.0	9.1	10	16	13	13	83	75	78	79	1.48	1.01
F..	29.478	30.18	28.47	25.5	32.5	30.4	29.5	60	-7	39.2	21.6	22	26	26	25	87	78	83	83	5.19	2.36
M..	29.428	29.90	28.81	32.5	45.5	38.7	38.9	72	19	48.5	31.3	28	31	31	30	84	58	74	72	0.76	0.47
A..	29.292	29.68	28.70	45.6	62.4	52.8	53.6	84	22	66.5	41.8	37	38	40	38	73	42	64	60	1.84	0.58
M..	29.308	29.61	28.82	60.4	72.5	66.5	66.5	89	48	76.6	57.6	53	53	55	54	78	52	68	66	2.54	0.67
J...	29.318	29.61	29.13	65.5	80.2	72.6	72.8	95	50	83.7	63.6	59	59	61	60	81	51	69	67	1.55	0.47
J...	29.313	29.47	29.16	70.9	87.3	79.2	79.1	100	60	90.7	69.1	63	61	63	62	76	44	60	60	1.57	0.80
A..	29.334	29.49	29.15	65.7	82.5	74.2	74.1	100	48	85.8	63.8	56	55	58	56	73	42	59	58	2.38	0.85
S..	29.390	29.74	29.08	58.3	73.2	66.1	65.9	96	36	77.3	57.2	52	52	52	52	80	51	63	65	3.13	1.10
O..	29.423	29.94	28.94	43.5	56.9	49.7	50.0	84	20	61.1	40.9	37	36	36	36	78	48	61	62	1.98	0.99
N..	29.413	29.91	28.95	33.7	47.4	40.3	40.5	76	7	51.9	31.9	26	29	26	27	75	52	61	63	1.18	0.53
D..	29.378	30.02	28.74	24.6	30.5	26.9	27.3	57	-11	35.6	19.6	20	23	22	22	84	75	82	80	2.73	1.47
Y..	29.369	30.18	28.62	45.1	57.9	51.4	51.4	100	-18	62.2	42.2	39	40	40	40	80	56	69	68	26.33	.....

KEY WEST, FLA.

[Latitude, 24° 34′ N.; longitude, 81° 49′ W.]

J..	30.145	30.39	29.83	64.9	68.8	65.9	66.5	79	50	72.2	62.1	60	61	62	61	86	77	86	82	0.77	0.60
F..	30.192	30.39	30.00	71.8	76.0	72.5	73.4	81	58	78.5	69.7	66	66	66	66	83	72	81	79	0.99	0.46
M..	30.070	30.39	29.82	69.1	73.0	70.0	70.7	82	58	75.3	66.7	62	61	63	62	78	67	79	75	1.99	1.46
A..	30.051	30.24	29.87	72.7	77.0	73.3	74.3	84	61	79.2	70.4	66	66	66	66	82	70	80	77	0.78	0.41
M..	30.003	30.15	29.88	76.8	79.7	76.0	77.5	86	69	82.1	73.2	68	67	68	68	75	66	76	72	2.48	1.26
J..	29.979	30.08	29.81	78.2	81.2	78.6	79.3	87	69	83.9	75.0	73	73	73	73	83	77	82	81	8.22	3.57
J..	30.066	30.16	29.93	81.8	84.8	81.5	82.7	90	70	87.7	77.6	74	74	74	74	77	70	78	75	5.52	2.01
A..	29.926	30.06	29.68	82.3	85.1	82.8	83.4	89	75	87.3	79.7	75	75	75	75	79	72	77	76	2.14	0.42
S..	29.968	30.08	29.75	80.2	83.6	80.5	81.4	88	72	86.0	76.3	73	73	73	73	80	72	79	77	7.30	3.01
O..	29.931	30.09	29.69	78.0	80.6	78.1	78.9	86	67	83.1	74.5	73	72	72	72	84	76	81	80	9.49	2.73
N..	30.036	30.18	29.86	71.6	74.6	72.8	73.0	82	57	76.3	69.3	66	65	66	65	82	72	79	78	1.33	1.22
D..	30.062	30.27	29.80	70.7	73.6	71.6	72.0	80	63	75.7	67.5	65	65	67	66	84	74	84	80	2.79	1.62
Y..	30.035	30.39	29.68	74.8	78.2	75.3	76.1	90	50	80.6	71.8	68	68	69	68	81	72	80	78	43.62	.....

KNOXVILLE, TENN.

[Latitude, 35° 56′ N.; longitude, 83° 58′ W.]

J..	29.087	29.50	28.51	31.2	42.9	38.4	37.5	69	5	47.7	27.0	25	28	28	27	79	58	69	68	3.99	1.97
F..	29.177	29.56	28.54	44.3	54.8	49.8	49.6	73	22	58.1	40.7	41	44	43	42	88	69	78	78	6.67	1.35
M..	29.020	29.30	28.72	41.1	54.4	48.3	47.9	76	22	58.7	38.5	36	36	37	37	82	55	68	68	3.97	2.08
A..	29.036	29.48	28.46	50.2	67.7	59.2	59.0	89	29	70.7	46.3	44	48	47	46	80	51	66	66	4.33	2.28
M..	28.999	29.26	28.76	62.1	79.4	69.1	70.2	88	52	81.5	59.1	59	60	62	60	89	54	78	74	4.79	1.65
J..	29.026	29.27	28.79	66.5	82.0	73.5	74.0	96	51	84.9	62.6	61	63	64	63	84	55	74	71	3.07	1.46
J..	29.021	29.22	28.88	73.5	84.6	77.5	78.5	100	65	89.0	70.3	69	67	70	69	86	59	78	74	2.93	0.55
A..	29.001	29.24	28.79	68.6	82.9	73.6	75.0	94	54	85.6	66.4	65	63	66	65	87	54	78	73	4.48	2.46
S..	29.094	29.32	28.76	61.3	79.2	69.1	69.9	94	38	81.1	58.2	57	55	59	57	86	45	70	67	1.63	0.62
O..	29.088	29.30	28.81	47.0	65.6	56.4	56.6	82	28	67.9	45.6	43	42	46	44	85	46	68	66	2.70	1.44
N..	29.128	29.55	28.54	38.0	57.5	47.0	47.5	73	15	59.2	35.9	31	33	33	32	78	40	59	59	0.93	0.52
D..	29.105	29.57	28.61	34.1	43.7	39.3	39.0	64	14	46.5	31.8	29	31	32	31	84	64	78	75	3.49	0.76
Y..	29.065	29.57	28.46	51.6	66.2	58.4	58.7	100	5	69.2	48.5	47	48	49	48	84	54	72	70	42.98	.....

LA CROSSE, WIS.

[Latitude, 43° 49′ N.; longitude, 91° 15′ W.]

J..	29.191	29.77	28.29	6.3	14.6	11.1	10.7	41	-29	20.8	1.2	-1	6	5	3	74	69	75	73	0.25	0.09
F..	29.345	30.09	28.43	10.3	19.9	17.8	16.0	44	-19	27.2	4.6	8	14	14	12	88	78	85	84	1.36	0.54
M..	29.317	29.93	28.66	23.9	34.8	30.0	29.6	66	-1	37.9	21.7	20	22	22	21	84	60	78	72	0.26	0.12
A..	29.129	29.59	28.56	39.8	55.6	47.8	47.7	79	12	58.7	36.6	33	35	36	35	80	49	65	64	1.94	1.11
M..	29.182	29.57	28.59	57.1	73.3	65.6	65.3	91	40	77.1	53.8	50	50	51	51	78	46	61	62	0.56	0.18
J..	29.196	29.54	28.95	63.1	79.5	70.7	71.1	93	44	82.2	60.6	57	56	59	57	82	46	68	65	0.96	0.58
J..	29.194	29.38	28.93	66.9	82.9	74.6	74.8	98	49	85.9	64.8	62	62	64	63	86	52	72	70	1.77	0.64
A..	29.236	29.42	29.00	60.6	74.6	67.8	67.7	96	42	77.8	58.3	55	55	57	56	85	54	72	70	2.21	0.74
S..	29.304	29.67	28.82	52.6	65.5	58.8	59.0	85	34	68.4	50.7	49	51	52	51	89	62	80	77	4.35	1.00
O..	29.254	29.76	28.76	38.0	51.2	43.8	44.3	82	6	54.1	35.1	32	33	33	33	80	51	69	67	1.62	0.62
N..	29.272	29.95	28.60	27.8	38.6	32.8	33.1	68	-19	41.6	24.6	22	24	24	23	81	59	73	71	0.81	0.39
D..	29.233	29.94	28.48	18.5	23.7	21.6	21.3	42	-21	28.8	14.0	16	18	19	17	90	79	89	86	1.32	0.36
Y..	29.238	30.09	28.29	38.7	51.2	45.2	45.0	98	-29	55.0	35.5	34	36	36	35	83	59	74	72	17.37	.....

Monthly and yearly meteorological summaries—Continued.

KEOKUK, IOWA.

[H=618. T=69. h=60.]

Cloudiness (in tenths).				Wind.													Number of days—										
7 a. m.	3 p. m.	10 p. m.	Mean.	Total (miles).	Maximum.	Direction.	Prevailing direction.	North.	Northeast.	East.	Southeast.	South.	Southwest.	West.	Northwest.	Calms.	Clear.	Fair.	Cloudy.	Foggy.	Rain or snow.	Max. below 32°.	Min. below 32°.	Max. above 90°.	Thunder-storms.	Auroras.	Months and year.
4.6	5.4	3.9	4.6	7,444	28	NW., SE.	NW.	7	9	5	5	17	10	16	22	2	9	17	5	0	10	16	29	0	0	0	J.
6.8	6.1	5.2	6.0	7,163	36	W., NW.	NW.	9	7	13	12	10	2	14	16	1	6	12	10	0	12	6	22	0	2	0	F.
5.2	4.3	3.6	4.4	7,015	36	NW.	N.	20	11	10	8	9	7	8	16	4	11	13	7	0	8	1	16	0	0	0	M.
3.5	4.6	2.7	3.9	8,582	38	NW.	S.	8	5	3	17	24	11	11	10	1	12	13	5	0	9	0	2	0	3	0	A.
4.2	4.4	3.8	4.2	5,305	50	SE.	S.	13	10	9	10	18	10	13	6	4	12	14	5	0	13	0	0	0	6	0	M.
3.9	4.5	2.8	3.7	5,205	36	SW.	SE.	5	1	11	20	19	8	10	13	3	13	14	3	0	6	0	0	4	4	0	J.
2.4	4.1	1.5	2.7	4,721	36	S.	S.	16	2	8	8	20	16	10	9	4	19	10	2	0	8	0	0	16	5	0	J.
4.4	4.7	3.1	4.1	5,090	24	SW., SE., NW.	N.	23	11	14	20	9	5	5	6	0	13	13	5	0	7	0	0	11	1	0	A.
4.8	5.4	3.5	4.6	5,933	27	S.	S.	14	12	12	12	17	12	2	6	3	15	7	8	0	11	0	0	5	2	0	S.
3.8	3.6	2.3	3.2	6,349	28	NW., SE., S., SE	NW.	9	4	5	9	15	13	9	26	3	14	13	4	0	7	0	6	0	1	0	O.
3.4	3.2	2.3	3.3	6,667	36	W., NW.	SW.	12	9	4	8	10	16	14	15	2	16	7	7	0	5	1	13	0	1	0	N.
5.4	4.8	3.8	4.7	7,246	30	SE., SW.	NW.	15	3	7	12	15	12	12	16	1	10	14	7	0	10	9	23	0	0	0	D.
4.4	4.6	3.4	4.1	76,670	..	.....	S.	151	84	101	141	183	122	124	161	28	150	147	68	0	106	33	111	36	25	0	Y.

KEY WEST, FLA.

[H=22, T=43. h=46.]

5.0	4.7	2.6	4.1	8,442	42	NW.	E.	26	13	29	5	9	3	3	3	2	12	15	4	0	6	0	0	0	0	0	J.
4.2	3.8	1.4	3.1	8,650	35	N.	E.	6	6	48	18	3	0	0	2	1	13	14	1	0	6	0	0	0	0	0	F.
4.5	3.0	2.8	3.4	8,436	37	N.	E.	13	16	20	17	4	3	9	11	0	18	8	5	0	5	0	0	0	3	0	M.
4.6	4.0	3.5	4.0	7,570	38	NW.	E.	13	15	24	16	6	1	5	9	1	7	19	4	0	6	0	0	0	0	0	A.
6.0	5.6	4.4	5.3	6,295	32	S.	E.	9	8	38	11	3	2	5	11	6	7	17	7	0	9	0	0	0	4	0	M.
8.5	8.2	7.5	8.1	5,563	24	SW.	E.	1	6	57	9	11	3	0	0	3	0	10	20	0	17	0	0	0	8	0	J.
6.9	6.7	4.2	5.9	4,536	25	SE.	E.	4	8	56	8	9	1	1	0	6	2	21	8	0	16	0	0	0	6	0	J.
5.7	5.7	3.2	4.9	6,413	34	NW.	E.	7	10	25	13	3	3	4	19	4	3	23	2	0	15	0	0	0	3	0	A.
6.2	6.1	4.6	5.6	7,234	47	NE.	E.	9	17	39	4	3	1	5	8	4	5	16	9	0	15	0	0	0	7	0	S.
6.7	7.2	5.7	6.5	8,687	36	NW.	E.	4	21	40	13	3	3	2	5	2	2	17	12	0	18	0	0	0	4	0	O.
5.0	4.5	3.1	4.2	8,676	36	NW.	NE.	18	46	15	1	0	0	2	8	0	9	15	6	0	2	0	0	0	1	0	N.
5.4	6.0	4.5	5.3	8,284	32	N.	NE., E	14	26	26	8	8	3	0	7	1	6	20	5	0	8	0	0	0	1	0	D.
5.7	5.5	4.0	5.1	89,586	..	.....	E.	124	192	417	123	62	23	36	83	30	84	195	83	0	123	0	0	0	37	0	Y.

KNOXVILLE, TENN.

[H=980. T=80. h=77.]

4.1	4.1	3.4	3.9	6,054	40	SW.	SW.	9	12	4	4	7	33	10	6	8	12	15	4	0	10	4	21	0	2	0	J.
6.9	6.9	5.8	6.5	5,090	40	SW.	SW.	9	15	5	2	3	24	8	5	13	5	11	12	0	16	0	4	0	3	0	F.
5.2	5.1	4.2	4.8	4,999	34	SW.	SW.	17	11	1	1	4	18	15	13	13	12	8	11	0	11	0	10	0	0	0	M.
3.5	3.4	3.3	3.4	4,756	36	SW.	SW.	13	8	9	4	3	21	12	9	11	14	12	4	0	10	0	1	0	6	0	A.
3.9	5.1	3.5	4.2	2,993	23	SW.	SW.	13	3	10	4	8	23	7	5	20	11	16	4	0	13	0	0	0	5	0	M.
2.6	3.8	1.8	2.7	3,350	29	SW.	SW.	10	17	3	4	7	23	13	0	13	16	14	0	0	6	0	0	4	6	0	J.
5.3	6.4	5.4	5.7	3,083	36	N.	NE.	1	22	7	6	11	17	13	6	10	7	13	11	0	15	0	0	11	8	0	J.
4.4	4.4	3.5	4.1	3,405	32	NW.	NE.	4	33	9	5	4	14	11	3	10	13	14	4	0	13	0	0	9	6	0	A.
4.1	4.0	2.8	3.6	3,428	32	NW.	SW.	5	21	13	2	9	27	4	3	6	15	10	5	0	7	0	0	5	1	0	S.
3.9	4.6	3.1	3.9	3,911	32	SW.	NE.	8	19	15	7	4	11	9	10	10	15	9	7	0	8	0	1	0	0	0	O.
4.2	4.0	2.3	3.5	3,560	36	SW., W	NE.	9	19	17	4	4	11	16	7	3	14	12	4	0	3	0	10	0	0	0	N.
7.0	7.0	6.2	6.7	3,846	30	SW.	NE.	5	26	13	4	4	12	15	10	4	6	9	16	0	18	1	16	0	0	0	D.
4.6	4.9	3.8	4.4	48,472	..	.....	SW.	103	206	106	47	68	234	133	77	121	140	143	82	0	130	5	63	29	37	0	Y.

LA CROSSE, WIS.

[H=744. T=79. h=71.]

4.8	6.6	5.7	5.7	5,918	26	W.	N.	24	2	3	7	22	5	12	18	0	4	20	7	0	6	23	31	0	0	0	J.
6.2	6.5	5.9	6.2	5,263	29	NW.	N.	26	4	2	7	17	1	6	19	2	6	9	13	0	13	17	28	0	0	0	F.
6.6	6.2	4.0	5.6	6,469	35	NW.	NW.	15	6	3	13	12	5	5	31	3	6	16	9	0	3	8	28	0	0	0	M.
6.3	7.2	5.3	6.3	6,921	40	N.	S.	6	10	4	5	25	16	6	18	0	3	16	11	0	12	0	11	0	4	0	A.
4.7	5.0	4.6	4.8	5,870	33	SE.	S.	5	6	5	9	34	12	3	15	4	9	13	9	0	5	0	0	1	2	1	M.
5.4	6.8	4.5	5.6	5,241	32	NW.	S.	3	2	2	11	34	7	6	20	5	6	15	9	0	5	0	0	3	3	0	J.
5.1	6.1	4.5	5.2	4,928	30	SW.	S.	9	2	0	8	36	9	9	18	2	6	18	7	0	10	0	0	8	9	0	J.
5.9	6.8	5.3	6.0	4,779	28	NW.	S.	11	7	6	14	24	6	2	17	6	4	16	11	0	11	0	0	5	8	0	A.
5.5	5.7	4.8	5.3	4,595	36	NW.	S.	10	11	7	7	27	9	6	10	3	9	10	11	1	16	0	0	0	2	0	S.
6.0	6.0	4.4	5.5	7,052	33	SW.	S.	3	3	2	2	31	17	10	25	0	7	15	9	0	7	1	14	0	3	0	O.
6.4	5.2	5.5	5.7	5,755	45	NW.	NW.	11	9	3	4	21	9	6	25	2	8	11	11	0	6	7	18	0	0	0	N.
7.9	7.3	7.3	7.5	5,928	29	SW.	S.	12	4	4	3	35	3	7	22	3	4	9	18	0	13	14	29	0	0	0	D.
5.9	6.3	5.2	5.8	68,719	..	.....	S.	135	66	41	90	318	99	78	238	30	72	168	125	1	107	70	159	17	31	1	Y.

***Monthly and yearly meteorological summaries*—Continued.**

LAMAR, MO.

[Latitude, 37° 32′ N.; longitude, 94° 15′ W.]

Months and year.	Pressure.			Temperature.								Dew point.				Relative humidity.				Precipitation.	
	Mean.	Maximum.	Minimum.	7 a. m.	2 p. m.	10 p. m.	Mean.	Maximum.	Minimum.	Mean. Maximum.	Mean. Minimum.	7 a. m.	2 p. m.	10 p. m.	Mean.	7 a. m.	2 p. m.	10 p. m.	Mean.	Total.	Max. 24 hours.
	In.	In.	In.	°	°	°	°	°	°	°	°	°	°	°	°					In.	In.
J..	28.947	29.57	28.37	22.8	34.8	28.3	28.6	68	-18	39.9	17.2	16	18	18	17	77	52	66	65	.63	0.42
F..	29.025	29.54	28.14	32.0	43.6	38.2	37.9	72	-3	48.8	28.0	28	32	31	30	84	65	76	75	1.78	0.69
M.	28.978	29.38	28.58	37.7	57.0	47.8	47.5	77	23	60.1	35.9	28	33	36	32	70	44	65	60	2.63	1.38
A..	24.896	29.28	28.40	47.0	68.6	58.3	58.0	86	24	70.9	44.4	35	42	42	40	65	41	56	54	4.78	1.83
M.	28.913	29.19	28.46	59.3	75.2	67.2	67.2	87	47	78.4	57.7	53	57	59	56	80	56	76	70	2.74	1.07
J..	28.917	29.10	28.72	66.1	80.8	72.6	73.2	91	50	83.0	63.2	59	59	64	61	78	50	76	69	6.90	2.49
J..	28.941	29.08	28.80	69.2	86.9	77.5	77.9	99	60	89.2	67.5	62	66	68	65	80	50	73	68	2.87	0.94
A..	28.949	29.07	28.81	66.3	84.4	74.1	74.9	98	48	87.1	64.3	62	66	65	65	88	56	76	73	3.85	1.89
S..	28.992	29.23	28.72	61.1	75.9	66.8	67.9	93	43	78.3	60.1	58	62	61	60	90	65	82	79	4.01	1.14
O..	29.046	29.40	28.66	44.5	63.6	52.8	53.6	87	22	66.5	42.1	40	44	43	42	84	53	70	69	1.94	1.11
N..	29.041	29.48	28.67	36.9	54.7	43.3	45.0	78	5	58.2	32.5	30	36	33	33	80	54	69	68	1.50	1.08
D..	29.010	29.59	28.42	26.6	35.5	30.0	30.7	61	-5	40.5	21.9	21	25	24	23	81	68	77	75	2.09	1.25
Y..	28.971	29.59	28.14	47.5	63.4	54.7	55.2	99	-18	66.7	44.6	41	45	45	44	80	54	72	69	35.72	.....

LANSING, MICH.

[Latitude, 42° 44′ N.; longitude, 84° 32′ W.]

J..	28.982	29.53	28.33	20.5	26.5	21.6	22.9	50	-14	29.2	13.5	16	21	17	18	84	78	81	81	3.88	1.30
F..	29.172	29.85	28.22	25.6	31.0	27.5	28.0	54	1	34.5	20.8	20	26	23	23	81	80	84	82	5.91	1.31
M.	29.115	29.80	28.42	28.3	37.0	31.9	32.4	56	8	40.1	23.9	23	29	26	26	81	72	79	78	1.98	0.69
A..	29.030	29.55	28.42	43.5	54.9	46.7	48.4	75	19	59.0	37.3	35	40	37	38	73	59	71	68	1.02	0.35
M.	29.087	29.37	28.70	62.9	73.2	64.1	66.7	90	45	75.5	54.5	55	59	57	57	75	62	79	72	1.75	0.45
J..	29.074	29.47	28.72	65.7	77.2	68.2	70.4	91	49	79.3	59.7	60	65	62	62	82	66	82	77	1.88	0.68
J..	29.066	29.27	28.76	71.9	84.0	75.3	77.1	100	52	86.6	66.3	66	72	68	69	82	69	79	77	1.55	0.65
A..	29.100	29.37	28.84	61.6	76.3	67.7	68.5	94	45	78.3	58.8	57	63	60	60	85	65	78	76	0.89	0.43
S..	29.178	29.52	28.75	53.2	67.1	58.2	59.5	86	34	69.2	50.7	50	58	54	54	90	73	87	83	5.21	1.59
O..	29.089	29.52	28.52	42.3	52.3	46.7	47.1	75	20	56.1	40.5	39	46	42	42	87	78	85	83	2.30	0.87
N..	29.082	29.88	28.28	34.1	43.3	38.1	38.5	64	16	47.0	31.7	30	37	34	34	86	79	85	83	1.96	0.71
D..	29.092	29.82	28.56	24.8	29.5	26.9	27.1	54	1	33.0	21.6	21	25	23	23	86	82	87	85	3.16	1.22
Y..	29.089	29.88	28.22	44.5	54.4	47.7	48.9	100	-14	57.3	39.9	39	45	42	42	83	72	82	79	31.49	.....

LOS ANGELES, CAL.

[Latitude, 34° 3′ N.; longitude, 118° 15′ W.]

J..	29.730	29.96	29.51	46.5	65.2	54.5	55.4	80	33	67.7	42.6	37	46	47	43	71	52	76	66	0.20	0.20
F..	29.712	29.97	29.32	44.5	58.1	52.2	51.6	82	35	60.4	42.2	41	48	48	46	90	69	86	82	9.25	3.94
M.	29.722	29.85	29.58	49.7	70.7	57.0	59.1	85	41	72.6	46.4	45	56	53	51	87	61	88	78	0.29	0.23
A..	29.643	29.82	29.46	51.3	68.2	57.8	59.1	87	40	70.8	49.6	48	54	52	52	90	63	83	79	2.86	1.05
M.	29.623	29.82	29.51	53.2	74.3	61.7	63.1	92	44	77.8	51.3	48	57	54	53	84	58	79	73	0.29	0.17
J..	29.525	29.67	29.40	55.6	78.0	64.7	66.1	100	47	81.1	54.4	53	62	60	58	92	59	84	78	0.07	0.04
J..	29.609	29.76	29.50	60.3	81.7	66.4	69.5	98	51	84.3	59.0	58	68	63	63	95	64	89	83	0.07	0.05
A..	29.524	29.66	29.41	59.6	80.9	65.1	68.5	94	52	82.7	57.6	57	65	62	62	93	60	90	81	T	T
S..	29.545	29.66	29.40	59.5	79.6	65.4	68.2	91	49	81.6	57.2	57	66	62	62	92	64	90	82	0.18	0.15
O..	29.589	29.78	29.22	56.0	77.2	64.3	65.8	93	47	79.5	53.0	49	59	58	55	81	57	81	73	0.17	0.12
N..	29.665	29.89	29.43	51.6	70.2	58.3	60.0	86	39	71.8	48.5	46	56	55	52	83	62	90	78	0.80	0.70
D..	29.734	29.91	29.48	46.4	61.8	53.0	53.7	73	35	63.7	42.6	40	48	47	45	80	62	81	74	2.68	1.86
Y..	29.635	29.97	29.22	52.8	72.2	60.0	61.7	100	33	74.5	50.4	48	57	55	54	86	61	85	77	16.27	....

LAS ANIMAS, COLO.

[Latitude, 38° 4′ N.; longitude, 103° 12′ W.]

J..	25.931	26.48	25.50	15.0	40.2	27.8	27.7	76	-18	45.5	10.3	11	23	19	18	85	54	72	70	0.13	0.09
F..	25.971	26.37	25.41	19.4	44.1	33.9	32.5	76	-6	51.0	15.4	14	26	22	21	80	52	63	65	0.11	0.09
M.	26.066	26.53	25.69	29.6	59.8	46.7	45.4	81	18	64.0	27.1	23	39	33	32	76	49	62	62	0.09	0.08
A..	25.943	26.38	25.53	39.0	63.4	53.0	51.8	87	21	67.1	37.7	35	48	44	42	85	61	73	73	2.55	1.14
M.	26.017	26.38	25.52	51.7	74.0	63.4	63.0	90	35	77.7	49.6	47	56	51	51	85	56	68	69	2.92	1.85
J..	25.976	26.32	25.78	61.6	83.5	72.4	72.5	96	51	87.1	59.4	57	65	62	61	85	56	70	70	1.89	0.99
J..	26.084	26.28	25.90	63.2	87.5	75.5	75.4	100	55	91.2	61.6	55	51	54	53	75	30	50	52	1.09	0.45
A..	26.024	26.30	25.83	63.1	84.7	74.4	74.1	100	52	88.6	60.7	54	49	52	52	74	34	51	53	2.35	1.22
S..	26.087	26.34	25.79	55.9	77.6	67.3	66.9	95	34	81.5	53.0	49	46	50	48	80	37	55	57	0.63	0.37
O..	26.103	26.52	25.46	40.1	63.7	51.8	51.9	92	21	67.9	37.3	32	30	34	32	73	34	54	54	1.10	0.96
N..	26.076	26.34	25.65	26.8	53.1	37.3	39.1	79	-16	57.3	21.8	12	14	15	14	60	30	47	46	0.28	0.23
D..	26.003	26.42	25.31	18.5	39.6	24.7	27.6	58	-11	42.0	14.3	12	15	16	14	78	41	71	64	0.32	0.30
Y..	26.023	26.53	25.31	40.3	64.3	52.4	52.3	100	-18	68.4	37.4	33	39	38	36	78	44	61	61	13.46	.....

Monthly and yearly meteorological summaries—Continued.

LAMAR, MO.

[$H = 1028$. $T = 60$. $h = 51$.]

Cloudiness (in tenths).				Wind.													Number of days—									
7 a. m.	3 p. m.	10 p. m.	Mean.	Total (miles).	Maximum.	Direction.	Prevailing direction.	North.	Northeast.	East.	Southeast.	South.	Southwest.	West.	Northwest.	Calms.	Clear.	Fair.	Cloudy.	Foggy.	Rain or snow.	Max. below 32°.	Min. below 32°.	Max. above 90°.	Thunder-storms.	Auroras.	Months and year.
4.4	5.1	2.9	4.1	9,241	40	SW.	SW.	15	13	4	7	8	24	12	10	0	14	11	6	0	3	12	26	0	0	0	J.
6.2	5.1	4.4	5.2	8,527	28	W.	N.	15	12	12	14	6	14	8	3	0	6	17	5	0	6	4	16	0	0	0	F.
2.6	5.2	4.2	4.3	9,191	40	S.	NE.	21	23	9	11	5	12	9	3	0	12	14	5	0	7	0	11	0	0	0	M.
3.2	4.8	3.7	3.9	9,478	39	SW.	SW.	16	4	3	10	17	24	7	9	0	9	20	1	0	8	0	2	0	0	0	A.
4.0	6.4	3.2	4.5	5,986	32	SW.	SW.	11	11	4	15	11	23	9	9	0	12	11	8	0	12	0	0	0	4	0	M.
2.4	5.1	3.7	3.7	5,723	43	SW.	SW.	4	5	5	21	18	31	3	2	1	14	11	5	0	10	0	0	1	4	0	J.
1.7	3.6	1.6	2.3	4,784	28	SW.	SW.	6	9	7	10	19	30	9	3	0	21	9	1	0	6	0	0	14	4	0	J.
5.4	5.8	4.3	5.2	5,591	30	SW.	S.	10	11	10	8	24	22	5	2	1	8	16	7	0	8	0	0	15	5	0	A.
5.8	6.5	5.0	5.8	5,139	30	N.	SW.	5	18	7	13	15	24	5	1	2	7	14	9	0	10	0	0	2	4	0	S.
2.8	2.8	2.5	2.7	6,912	37	S.	S.	15	10	8	10	16	14	4	15	1	20	6	5	0	6	0	4	0	1	0	O.
2.7	2.8	2.7	2.1	7,206	48	NW.	S.	15	4	3	15	23	15	1	14	0	17	7	6	0	3	1	14	0	1	0	N.
5.4	5.6	4.2	5.1	7,676	36	NW., S.	NW.	16	2	4	16	16	11	9	19	0	11	10	10	0	10	5	23	0	0	0	D.
4.0	4.9	3.5	4.1	85,454	..	.....	SW.	149	122	76	150	178	244	81	90	5	151	146	68	0	89	22	96	32	23	0	Y.

LANSING, MICH.

[$H = 870$. $T = 44$. $h = 42$.]

8.0	6.5	4.6	6.4	7,044	28	W.	SW.	8	6	4	3	14	23	20	13	2	5	15	11	0	19	18	28	0	0	0	J.
7.4	8.7	7.0	7.7	6,187	36	SW.	SW.	2	11	8	11	9	15	12	14	2	2	11	15	0	23	8	26	0	0	0	F.
5.0	6.2	4.6	5.3	5,474	28	W., NW	NW.	19	8	11	8	10	5	9	22	1	10	12	9	0	8	6	26	0	0	0	M
6.2	5.5	1.9	4.5	6,225	36	SW.	SW.	4	7	9	18	6	23	9	14	0	9	15	6	0	11	0	6	0	1	0	A.
3.9	4.8	1.8	3.5	4,091	25	SW.	NE.	5	21	5	19	7	16	9	9	2	18	9	4	0	13	0	0	0	4	0	M.
5.6	5.4	3.4	4.8	4,028	20	SW.	SW.	4	16	6	12	12	19	14	5	2	9	17	4	0	13	0	0	1	2	0	J.
3.7	4.6	1.9	3.4	4,408	21	S.	SW.	10	17	3	4	13	24	11	10	1	14	14	3	0	8	0	0	7	2	1	J.
4.5	5.9	2.3	4.2	3,429	20	W.	N., SW., NW.	16	14	4	6	13	16	4	16	4	11	16	4	0	9	0	0	4	1	0	A.
5.2	5.8	3.3	4.8	4,063	28	SW.	NE.	6	18	14	14	6	17	3	9	3	8	17	5	0	11	0	0	0	1	1	S.
6.1	6.4	5.3	5.9	5,867	42	SW.	SW.	5	2	0	2	21	22	20	20	1	8	10	13	0	15	0	8	0	1	0	O.
6.6	6.0	5.8	6.1	6,313	32	SW.	SW.	1	13	4	4	16	21	11	20	0	7	10	13	0	9	3	15	0	0	0	N.
8.0	9.0	7.6	8.2	6,335	34	SW.	SW.	6	2	9	17	15	27	2	15	0	1	10	20	0	16	10	27	0	0	0	D.
5.8	6.2	4.1	5.4	63,484	..	.....	SW.	86	135	77	118	142	228	124	167	18	102	156	107	0	155	45	136	12	12	2	Y.

LOS ANGELES, CAL.

[$H = 339$. $T = 57$. $h = 107$.]

1.8	2.4	1.6	1.9	4,368	24	NW.	NE.	10	26	7	8	7	3	16	11	5	21	10	0	0	2	0	0	0	0	0	J.
2.8	4.8	4.2	3.9	5,300	32	NW.	SE.	7	11	14	15	9	4	14	7	3	13	9	6	0	13	0	0	0	1	0	F.
2.5	3.0	1.4	2.3	3,823	18	W.	W.	4	12	7	2	5	9	37	8	9	18	12	1	0	2	0	0	0	0	0	M.
5.3	4.6	4.9	4.9	4,087	37	W.	W.	3	9	7	4	6	8	45	6	2	11	10	9	0	5	0	0	0	0	0	A.
3.3	3.9	3.3	3.5	4,694	30	NW.	W.	4	8	4	5	7	16	44	3	1	14	11	5	0	3	0	0	2	1	0	M.
3.6	1.7	2.1	2.5	4,444	20	W.	W.	0	4	8	3	6	10	56	3	0	17	10	3	0	1	0	0	2	0	0	J.
5.8	1.7	2.5	3.3	3,974	20	W.	W.	0	2	0	0	3	21	66	0	1	13	13	5	0	2	0	0	3	0	0	J.
6.8	1.0	0.5	2.8	4,030	18	W.	W.	2	0	1	0	5	13	69	3	0	11	20	0	0	0	0	0	3	0	0	A.
3.7	1.6	2.9	2.7	3,748	23	W.	W.	5	1	6	2	6	6	60	4	0	15	12	3	0	1	0	0	2	0	0	S.
1.9	1.9	1.5	1.5	4,219	34	NE.	W.	6	13	11	6	6	6	35	8	2	24	6	1	0	1	0	0	5	0	0	O.
2.3	3.3	2.5	2.7	3,669	18	W.	W.	12	15	9	3	7	9	22	8	5	18	9	3	0	3	0	0	0	0	0	N.
2.1	3.2	2.2	2.5	4,772	37	E.	NE.	8	17	16	14	7	10	9	10	2	21	7	3	0	4	0	0	0	0	0	D.
3.4	2.8	2.5	2.9	51,148	..	.....	W.	61	118	90	62	74	115	473	71	30	196	129	39	0	37	0	0	17	2	0	Y.

LAS ANIMAS, COLO.

[$H = 3899$. $T = 22$. $h = 7$.]

2.3	5.7	3.7	4.2	5,928	42	SW.	W.	9	6	14	5	2	7	41	7	2	11	18	2	0	4	8	30	0	0	0	J.
3.7	4.6	3.9	4.1	6,551	52	N.	E.	6	5	24	12	3	12	14	4	4	13	10	5	0	2	2	26	0	0	0	F.
3.4	4.8	3.4	3.7	5,804	39	N.	W.	9	9	15	7	8	13	22	6	4	14	12	5	0	2	0	26	0	0	0	M.
3.0	5.3	4.6	5.0	7,215	48	N.	W.	4	9	11	14	13	8	23	7	1	7	17	6	0	10	0	5	0	1	0	A.
3.9	5.0	4.1	4.3	6,078	42	NW.	W.	4	10	20	14	9	6	21	9	0	13	12	6	0	11	0	0	0	8	0	M.
3.4	4.0	5.0	4.1	5,728	36	NE.	E.	1	8	26	16	14	11	11	2	1	11	15	4	0	6	0	0	11	6	0	J.
2.6	3.5	5.5	3.9	5,066	48	NW.	E.	11	6	21	15	12	10	11	5	2	11	18	2	0	9	0	0	17	12	0	J.
4.4	3.9	4.5	4.3	4,977	36	N.	E.	6	6	25	16	9	10	14	3	4	11	15	5	0	8	0	0	14	9	0	A.
3.3	3.5	3.0	3.3	4,599	36	N.	E.	9	11	20	12	7	10	7	8	6	17	9	4	0	6	0	0	6	2	0	S.
3.1	3.9	3.5	3.5	4,579	33	NE.	E.	11	15	22	10	2	9	16	4	4	16	10	5	0	4	0	9	2	1	0	O.
2.5	4.1	3.0	3.2	3,591	24	N.	W.	15	14	20	1	4	6	27	9	4	19	7	4	0	2	2	27	0	0	0	N.
3.2	4.0	3.6	3.6	4,354	48	W.	W.	13	9	8	4	6	9	29	10	5	12	17	2	0	2	6	31	0	0	0	D.
2.8	4.3	3.9	3.9	64,470	..	.....	W.	88	108	226	126	89	111	236	74	37	155	160	50	0	66	18	154	50	39	0	Y.

Monthly and yearly meteorological summaries—Continued.

LEAVENWORTH, KANS.

[Latitude, 39° 19′ N.; longitude, 94° 57′ W.]

Months and year.	Pressure.			Temperature.								Dew point.				Relative humidity.				Precipitation.	
	Mean.	Maximum.	Minimum.	7 a. m.	3 p. m.	10 p. m.	Mean.	Maximum.	Minimum.	Mean. Maximum.	Mean. Minimum.	7 a. m.	3 p. m.	10 p. m.	Mean.	7 a. m.	3 p. m.	10 p. m.	Mean.	Total.	Max. 24 hours.
	In.	In.	In.	°	°	°	°	°	°	°	°	°	°	°	°					In.	In.
J	29.142	29.80	28.52	15.5	25.8	20.8	20.7	60	-16	31.3	10.5	11	11	14	12	81	55	75	70	1.27	0.55
F	29.256	29.86	28.21	23.8	32.8	30.1	28.9	68	- 6	38.5	20.6	19	21	25	22	81	64	80	75	1.94	0.57
M	29.204	29.63	28.77	34.4	51.4	42.2	42.7	84	20	54.3	32.9	27	28	32	29	73	44	69	62	1.50	0.80
A	29.064	29.47	28.48	48.4	67.0	56.4	57.3	87	26	70.0	46.0	39	39	44	41	71	40	66	59	1.99	0.82
M	29.094	29.44	28.52	60.3	76.2	67.3	67.9	90	45	79.8	59.1	52	54	57	54	77	48	71	65	3.07	0.79
J	29.088	29.32	28.92	66.9	81.0	72.1	73.3	96	51	84.0	65.0	61	62	65	63	83	55	79	72	5.43	1.63
J	29.105	29.24	28.96	70.4	88.9	78.4	79.2	102	57	91.8	68.0	64	64	66	65	82	46	67	65	1.36	0.60
A	29.114	29.32	28.94	66.0	80.7	73.3	73.3	100	48	84.6	63.9	61	64	64	63	86	59	74	73	7.11	2.32
S	29.165	29.47	28.83	60.4	73.8	65.9	66.7	95	43	77.5	57.8	55	58	58	57	84	61	78	74	5.73	1.74
O	29.216	29.67	28.72	43.0	62.5	52.2	52.6	89	23	65.4	40.8	38	40	41	39	82	45	67	65	3.87	3.10
N	29.220	29.67	28.81	33.8	51.9	42.6	42.8	80	- 4	54.4	31.3	27	34	32	31	76	54	66	65	1.14	0.66
D	29.189	29.81	28.61	22.6	32.2	26.9	27.2	62	-10	37.4	19.2	17	21	20	20	79	67	76	74	2.55	1.37
Y	29.154	29.86	28.21	45.5	60.4	52.4	52.8	102	-16	64.1	42.9	39	41	43	41	80	53	72	68	37.05	.....

LEXINGTON, KY.

[Latitude, 38° 2′ N.; longitude, 84° 33′ W.]

J	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
F	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
M	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
A	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
M	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
J	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
J	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
A	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
S	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
O	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
N	29.061	29.61	28.45	37.6	50.9	43.6	44.0	72	6	54.6	33.1	28	29	30	29	71	47	62	60	3.02	1.00
D	29.037	29.57	28.55	31.1	39.3	35.7	35.4	60	3	43.7	26.8	26	29	28	28	81	69	74	75	2.71	1.24
Y	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

LITTLE ROCK, ARK.

[Latitude, 34° 45′ N.; longitude, 92° 6′ W.]

J	29.766	30.32	29.17	33.7	46.8	41.7	40.7	72	7	50.7	31.2	28	29	31	29	80	54	68	67	2.26	1.46
F	29.834	30.22	29.06	42.5	51.1	49.0	47.5	72	23	58.2	38.8	36	38	40	38	79	66	73	73	6.42	2.50
M	29.738	29.99	29.47	47.7	61.8	56.6	55.4	75	30	66.0	44.5	41	45	45	44	78	57	66	67	4.54	2.02
A	29.699	30.06	29.18	54.4	72.3	65.2	64.0	90	34	75.8	50.1	49	52	52	51	82	51	64	66	.49	0.33
M	29.646	29.90	29.36	65.0	79.0	70.2	71.4	89	52	82.0	62.4	62	63	64	63	91	60	82	78	6.08	1.94
J	29.658	29.83	29.43	69.3	83.6	75.1	76.0	96	59	86.1	67.0	66	68	70	68	89	60	85	78	2.20	0.43
J	29.672	29.84	29.52	74.2	89.4	80.0	81.2	100	64	91.8	71.6	70	68	72	70	88	52	76	72	1.74	0.63
A	29.650	29.79	29.50	71.6	87.0	78.3	79.0	90	59	89.7	70.2	67	64	68	66	84	48	71	68	1.18	0.60
S	29.700	29.92	29.5	66.8	83.0	74.9	74.9	97	50	85.0	65.8	60	59	62	60	80	47	66	64	1.04	0.48
O	29.770	30.07	29.51	52.0	71.0	61.2	61.4	89	33	73.2	51.5	45	44	46	45	78	41	59	59	.97	0.82
N	29.807	30.28	29.45	42.7	61.1	51.6	51.8	77	0	63.5	39.5	34	38	36	36	74	46	59	60	4.50	2.05
D	29.774	30.38	29.17	37.4	44.6	41.0	41.0	65	14	47.6	33.9	32	33	33	33	82	69	76	76	7.14	2.36
Y	29.726	30.38	29.06	54.8	69.2	62.1	62.0	100	0	72.6	52.2	49	50	52	50	82	54	70	69	38.56	.....

LOUISVILLE, KY.

[Latitude, 38° 15′ N.; longitude, 85° 45′ W.]

J	29.477	30.04	28.79	27.7	36.7	31.8	32.1	67	- 5	41.9	22.4	21	23	24	23	76	61	74	70	4.08	1.23
F	29.585	30.06	28.71	39.9	45.4	43.8	43.0	78	19	53.2	34.4	34	34	36	35	82	67	74	74	7.60	2.48
M	29.467	29.82	28.91	36.9	51.7	45.2	45.3	79	18	55.8	36.3	30	31	32	31	71	48	62	60	1.86	1.23
A	29.443	29.85	28.75	47.8	63.9	57.4	56.4	87	30	67.4	45.0	38	36	41	38	70	40	56	55	7.31	3.28
M	29.409	29.65	29.11	63.8	78.6	70.4	70.9	90	54	80.6	60.5	56	55	58	56	77	46	67	6[illegible]	2.12	0.51
J	29.435	29.68	29.18	68.5	83.0	74.7	75.4	96	53	85.1	64.3	59	56	59	58	72	42	60	58	1.79	0.96
J	29.417	29.58	29.22	75.1	90.1	81.6	82.3	102	65	92.8	71.5	66	67	66	67	75	48	61	62	1.86	1.17
A	29.418	29.66	29.21	70.1	87.1	77.6	78.3	99	55	88.5	67.8	60	58	61	60	70	40	57	56	2.74	1.84
S	29.501	29.76	29.19	63.1	79.0	70.3	70.8	94	42	80.4	60.6	52	53	53	53	69	45	57	57	2.84	1.62
O	29.523	29.80	29.23	47.4	64.0	55.2	55.5	84	26	66.2	44.5	36	38	39	38	69	40	55	55	0.39	0.24
N	29.539	30.12	28.95	39.8	53.2	45.4	46.1	75	8	56.4	34.4	29	31	30	30	68	46	58	57	2.51	0.91
D	29.529	30.09	28.99	32.6	40.3	36.7	36.5	60	4	43.8	28.5	26	30	29	28	76	68	74	72	3.03	1.22
Y	29.478	30.12	28.71	51.2	61.4	57.5	57.7	102	- 5	67.7	47.5	42	43	44	43	73	49	63	62	38.15	.....

Monthly and yearly meteorological summaries—Continued.

LEAVENWORTH, KANS.

[H = 842. T = 56. h = 50.]

Cloudiness (in tenths).				Wind.													Number of days—										
7 a. m.	2 p. m.	10 p. m.	Mean.	Total (miles).	Maximum.	Direction.	Prevailing direction.	North.	Northeast.	East.	Southeast.	South.	Southwest.	West.	Northwest.	Calms.	Clear.	Fair.	Cloudy.	Foggy.	Rain or snow.	Max. below 32°.	Min. below 32°.	Max. above 90°.	Thunder-storms.	Auroras.	Months and year.
5.4	5.4	2.5	4.4	5,919	28	W.	S.	25	1	2	8	26	3	5	22	1	11	16	4	0	6	15	29	0	0	0	J.
6.0	5.9	4.8	5.6	5,540	30	NW.	N.	21	5	3	11	20	3	0	20	1	6	13	9	0	15	8	24	0	1	0	F.
4.6	5.1	2.0	3.9	5,987	28	NW.	N.	28	4	8	14	14	0	2	22	1	15	13	3	0	8	1	16	0	2	0	M.
4.5	5.3	2.0	3.9	6,805	29	NW.	S.	9	2	2	15	30	5	2	24	1	10	16	4	0	8	0	3	0	0	0	A.
5.5	5.0	3.0	4.5	4,823	30	S.	N.	23	7	3	16	21	2	4	13	4	10	15	6	0	12	0	0	0	5	0	M.
5.1	4.2	3.1	4.1	4,235	20	SE.	S.	6	3	8	26	35	1	0	8	3	11	13	6	0	12	0	0	4	9	0	J.
3.2	3.2	1.4	2.6	3,720	24	NW.	S.	20	2	4	12	25	9	2	11	8	16	14	1	0	5	0	0	19	2	0	J.
5.6	6.1	2.8	4.8	3,755	33	N., SW.	SE.	18	5	1	24	22	0	2	8	13	7	18	6	0	12	0	0	10	6	0	A.
6.5	6.2	2.6	5.1	4,468	27	S.	N., SE.	22	4	3	22	21	0	0	6	12	9	14	6	0	12	0	0	4	0	0	S.
3.6	2.6	2.3	2.8	5,064	27	S.	S.	22	1	3	13	25	0	3	15	11	18	10	3	0	6	0	5	0	0	0	O.
3.7	3.9	2.9	3.5	5,016	36	NW.	S.	23	2	2	8	28	3	3	14	7	14	11	5	0	6	2	13	0	2	0	N.
4.6	4.8	3.2	4.2	5,454	28	NW.	NW.	20	6	1	5	27	0	2	29	3	14	10	7	1	7	8	26	0	0	0	D
4.9	4.8	2.7	4.1	60,795	..	.....	S.	237	42	40	174	294	26	25	192	65	141	163	60	1	109	34	116	37	27	0	Y.

LEXINGTON, KY.

[H = 995. T = 72. h = 64.]

...	...	...	...	.....	..	.....	.....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	J.
...	...	...	...	.....	..	.....	.....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	F.
...	...	...	...	.....	..	.....	.....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	M.
...	...	...	...	.....	..	.....	.....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	A.
...	...	...	...	.....	..	.....	.....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	M.
...	...	...	...	.....	..	.....	.....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	J.
...	...	...	...	.....	..	.....	.....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	J.
...	...	...	...	.....	..	.....	.....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	A.
...	...	...	...	.....	..	.....	.....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	S.
...	...	...	...	.....	..	.....	.....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	O.
3.8	4.5	3.0	3.8	5,005	30	SW.	S.	4	5	0	12	25	19	6	8	11	15	11	4	0	8	3	11	0	0	0	N.
6.9	7.8	6.6	7.1	5,704	36	SE.	SE.	0	5	8	21	15	20	11	8	5	6	7	18	0	12	3	21	0	0	0	D.
...	...	...	...	.....	..	.....	.....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	Y.

LITTLE ROCK, ARK.

[H = 309. T = 75. h = 56.]

4.1	3.2	2.6	3.3	6,006	34	SW.	S.	3	6	5	10	30	14	5	16	4	16	11	4	0	6	5	16	0	1	0	J.
6.3	6.1	5.1	5.8	4,623	23	SW., NW.	NW.	13	15	13	2	15	4	4	16	2	6	11	11	0	13	1	5	0	2	0	F.
3.5	3.8	2.3	3.2	4,387	20	SW., N.	NW.	13	9	13	8	13	15	2	19	1	19	6	6	0	6	0	1	0	1	0	M.
3.1	2.5	1.4	2.3	5,117	24	S.	S.	10	1	7	15	23	9	13	6	6	20	9	1	0	4	0	0	0	3	0	A.
4.6	4.9	2.8	4.1	3,522	28	NW.	S.	12	5	15	4	21	8	13	8	7	11	15	5	0	15	0	0	0	10	0	M.
3.5	4.5	4.1	4.0	3,381	20	NE.	E.	15	13	21	6	14	4	5	2	10	12	13	5	0	15	0	0	5	6	0	J.
3.7	4.4	2.6	3.6	3,008	31	NW.	SW.	6	6	10	8	15	16	8	11	13	15	14	2	0	7	0	0	21	2	0	J.
4.1	4.7	2.6	3.8	3,396	22	NE.	NE.	10	18	16	11	8	6	4	10	9	15	10	5	0	7	0	0	20	1	0	A.
3.7	4.3	2.6	3.5	3,433	20	NE.	NE.	3	27	9	5	13	6	6	5	16	15	11	4	0	6	0	0	12	1	0	S.
3.8	3.9	2.4	3.1	4,520	23	N.	NE.	13	17	6	5	11	8	10	8	14	18	8	4	0	5	0	0	0	0	0	O.
2.3	2.0	2.0	2.1	3,946	27	NW.	SW.	9	11	6	5	8	12	9	8	21	21	5	3	0	6	0	5	0	1	0	N.
6.7	6.9	5.8	6.5	5,053	26	NE.	N.	23	9	9	12	8	1	12	11	8	7	10	14	0	15	3	13	0	2	0	D.
4.1	4.2	3.0	3.8	50,392	..	.....	S.	130	137	130	91	179	103	91	120	111	175	123	64	0	105	9	40	58	30	0	Y.

LOUISVILLE, KY.

[H = 551. T = 100. h = 103.]

5.6	6.3	5.6	5.8	7,987	36	SW.	S., SW.	8	7	3	7	24	24	15	4	1	6	15	10	0	14	11	21	0	1	0	J.
8.2	7.7	6.1	7.3	6,297	36	S.	S.	8	10	11	6	17	12	16	3	1	3	9	16	0	18	1	9	0	4	0	F.
6.0	5.6	5.0	5.5	6,186	43	SW.	W.	19	14	5	3	8	13	20	7	4	8	12	11	0	12	0	11	0	2	0	M.
4.3	4.9	3.9	4.4	6,125	36	NW.	S.	4	7	6	13	25	10	14	7	4	11	13	6	0	9	0	3	0	5	0	A.
4.4	6.5	3.0	4.6	4,134	24	SW.	N.	23	16	7	11	13	12	6	5	0	8	15	8	0	14	0	0	1	5	0	M
3.5	5.4	2.1	3.7	4,897	24	SW.	S.	5	12	13	6	19	18	9	3	5	12	15	3	0	6	0	0	7	1	0	J.
3.9	4.8	2.0	3.6	4,132	24	W., SE.	SW.	15	12	7	13	16	18	8	2	2	16	12	3	0	10	0	0	20	3	0	J.
4.1	3.9	2.9	3.6	4,702	48	W.	N.	26	12	6	4	17	8	10	9	1	13	14	4	0	4	0	0	14	4	0	A.
5.7	6.1	3.4	5.1	4,677	24	W.	N.	18	12	12	10	15	12	4	3	4	7	16	7	0	12	0	0	6	0	0	S.
3.9	4.1	2.9	3.6	5,743	32	W.	N.	23	8	2	10	14	19	10	6	1	15	10	6	0	4	0	2	0	0	0	O.
4.6	3.8	3.7	4.0	5,355	36	W.	S.	9	7	5	9	23	12	12	9	4	13	10	7	0	8	2	9	0	0	0	N.
7.3	7.4	6.0	6.9	5,766	36	SE.	W.	4	16	7	11	10	14	23	6	2	4	10	17	0	13	5	18	0	0	0	D.
5.1	5.5	3.9	4.8	66,001	..	.....	S.	162	133	84	103	201	172	147	64	29	116	151	98	0	124	19	73	48	25	0	Y.

Monthly and yearly meteoro logical summaries—Continued.

LYNCHBURGH, VA.

[Latitude, 37° 25′ N.; longitude, 79° 9′ W.]

Months and year.	Pressure.			Temperature.								Dew point.				Relative humidity.				Precipitation.	
	Mean.	Maximum.	Minimum.	7 a. m.	3 p. m.	10 p. m.	Mean.	Maximum.	Minimum.	Mean. Maximum.	Mean. Minimum.	7 a. m.	3 p. m.	10 p. m.	Mean.	7 a. m.	3 p. m.	10 p. m.	Mean.	Total.	Max 24 hours.
	In.	In.	In.	°	°	°	°	°	°	°	°	°	°	°	°					In.	In.
J ..	29.382	29.91	28.94	30.0	41.9	34.4	35.4	65	6	44.8	26.3	25	26	26	26	81	56	73	70	2.64	1.42
F ..	29.526	30.11	28.84	38.5	49.5	43.1	43.7	72	20	54.1	35.4	32	34	35	34	79	69	76	72	3.51	1.38
M .	29.297	29.96	28.86	37.3	51.6	41.6	43.5	81	24	53.9	33.8	28	28	29	28	71	46	65	61	2.58	0.73
A ..	29.337	29.92	28.68	46.6	62.9	50.9	53.5	85	31	64.9	42.2	39	40	43	41	76	47	76	66	3.29	0.92
M .	29.337	29.66	28.97	63.8	78.0	64.8	68.9	94	47	79.9	57.8	57	56	60	58	79	49	85	71	3.59	1.52
J ..	29.344	29.66	29.03	67.9	81.7	68.7	72.8	98	49	83.8	61.5	60	62	64	62	77	53	84	71	3.65	1.08
J ..	29.325	29.54	29.10	75.2	88.4	76.1	79.9	102	62	91.3	69.9	70	71	72	71	84	58	86	76	4.92	1.87
A ..	29.321	29.59	29.02	68.7	82.0	71.3	74.0	95	50	85.1	65.3	64	65	67	65	87	58	86	77	4.73	0.99
S ..	29.438	29.73	29.08	59.6	75.9	64.5	66.7	97	37	78.2	56.8	56	57	59	57	89	54	84	76	3.11	1.84
O ..	29.374	29.78	28.91	48.8	63.6	52.8	55.1	88	30	66.9	45.9	45	45	47	46	88	56	83	75	3.31	1.02
N ..	29.411	30.02	28.80	38.9	56.4	43.7	46.3	75	22	58.7	36.3	33	32	36	34	82	42	77	67	1.01	0.34
D ..	29.433	30.11	28.79	33.5	43.7	36.4	37.9	62	13	45.6	30.2	28	25	29	27	82	53	75	70	4.28	1.72
Y ..	29.377	30.11	28.68	50.7	64.6	54.0	56.4	102	6	67.3	46.8	45	45	47	46	81	53	79	71	40.62	.....

MACKINAW CITY, MICH.

[Latitude, 45° 47′ N.; longitude, 84° 39′ W.]

J ..	29.235	29.84	28.36	10.9	16.5	12.6	13.3	42	-14	21.5	2.4	3	6	5	5	70	65	70	68	.86	0.14
F ..	29.445	30.20	28.46	11.9	19.7	16.8	16.1	41	-12	25.1	5.1	2	12	8	7	66	70	70	69	1.87	0.94
M .	29.405	30.08	28.82	15.2	25.8	19.2	20.1	40	-10	29.1	8.6	4	15	9	9	62	62	64	63	.22	0.11
A ..	29.264	29.81	28.42	31.0	37.4	33.2	33.9	69	9	42.8	26.5	25	28	28	27	79	70	82	77	1.46	0.45
M .	29.332	29.65	28.89	45.9	53.9	46.0	49.3	83	32	62.2	41.2	40	42	42	41	82	68	81	77	1.49	0.74
J ..	29.330	29.75	28.94	56.1	62.5	57.5	58.7	79	44	67.2	51.5	52	52	53	52	87	72	86	81	1.11	0.26
J ..	29.301	29.56	28.95	65.1	72.5	66.1	67.9	89	48	75.8	60.4	61	60	60	60	85	68	83	79	2.38	0.68
A ..	29.376	29.59	29.08	59.3	67.8	61.7	62.9	88	46	70.6	55.4	52	52	52	52	78	58	72	70	.28	0.08
S ..	29.442	29.84	28.82	50.8	58.6	53.6	54.3	76	32	61.7	47.7	45	46	45	45	79	64	74	72	1.65	0.65
O ..	29.305	29.76	28.62	40.1	45.8	40.9	42.3	75	20	48.7	36.2	34	36	34	35	81	70	78	76	1.59	0.35
N ..	29.333	30.28	28.59	31.7	35.1	32.8	33.2	62	6	38.3	27.2	25	26	26	26	78	72	80	76	1.69	0.27
D ..	29.348	30.12	28.88	25.5	27.5	26.7	26.6	49	7	30.8	21.3	22	23	23	22	86	82	87	85	1.08	0.23
Y ..	29.343	30.28	28.36	37.0	43.6	39.1	39.9	89	-14	47.8	32.0	30	33	32	32	78	68	77	74	15.08	.....

FORT MAGINNIS, MONT.

[Latitude, 47° 12′ N.; longitude, 109° 10′ W.]

J ..	25.283	25.83	24.75	15.2	22.3	17.9	18.5	47	-26	28.3	8.3	9	12	10	10	75	66	71	71	2.77	1.08
F ..	25.415	25.90	24.90	4.2	14.0	8.4	8.9	56	-42	19.1	-3.6	-3	4	1	0	71	64	71	69	.94	0.56
M .	25.519	25.92	25.00	32.7	42.8	34.6	36.7	69	-3	48.0	24.8	21	24	22	22	62	49	59	57	1.19	0.58
A ..	25.463	25.79	25.15	36.4	46.9	40.0	41.1	76	18	51.9	32.6	25	26	26	26	64	46	60	57	2.16	0.97
M .	25.551	26.02	25.14	45.6	60.5	51.4	52.5	88	26	66.3	40.7	26	29	28	28	49	32	43	41	.51	0.31
J ..	25.535	25.92	25.23	51.1	63.5	57.3	57.3	84	33	70.2	46.5	38	41	41	40	61	47	57	55	2.53	0.55
J ..	25.653	25.83	25.40	56.5	73.5	64.4	64.8	91	42	78.6	52.6	45	50	49	48	66	46	60	57	2.41	1.37
A ..	25.600	25.91	25.31	53.0	69.6	58.5	60.4	89	40	73.6	49.6	46	52	50	49	77	56	76	70	4.54	2.96
S ..	25.606	25.89	25.31	46.2	62.4	52.0	53.5	85	28	68.3	43.0	38	48	44	44	76	62	76	71	5.15	3.25
O ..	25.623	26.01	25.14	33.7	48.1	40.0	40.6	77	-11	52.7	30.6	26	34	31	31	76	63	73	71	1.99	1.17
N ..	25.547	25.79	25.18	26.9	39.2	31.8	32.6	67	-13	43.4	24.4	21	29	25	25	80	70	76	76	1.39	1.07
D ..	25.388	25.73	25.08	19.1	24.9	18.4	20.8	54	-14	29.1	9.6	14	19	15	16	82	82	87	84	.42	0.16
Y ..	25.515	26.02	24.75	35.0	47.3	39.6	40.6	91	-42	52.5	29.9	25	31	29	28	70	57	67	65	26.00	.....

MANCHESTER, N. H.

[Latitude, 42° 58′ N.; longitude, 71° 28′ W.]

J ..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
F ..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
M .	29.605	30.55	28.83	22.7	33.3	26.1	27.4	49	-4	36.2	18.8	17	24	20	20	77	70	79	75	3.68	1.26
A ..	29.689	30.40	28.87	36.9	48.5	39.4	41.6	79	18	51.3	30.5	28	30	30	29	72	54	69	65	2.54	0.80
M .	29.789	30.12	29.31	56.7	69.8	56.7	61.1	89	35	72.4	47.8	44	46	43	44	66	49	65	60	2.29	0.96
J ..	29.754	30.10	29.38	62.2	72.4	62.2	65.6	93	41	75.1	53.8	54	54	56	55	77	57	81	72	3.37	1.20
J ..	29.704	29.95	29.30	69.5	80.4	69.8	73.2	93	56	82.8	63.9	64	66	65	65	84	63	85	77	7.14	4.63
A ..	29.719	30.11	29.31	60.7	72.7	62.6	65.3	88	46	75.8	55.3	57	59	59	58	88	65	88	80	6.33	2.41
S ..	29.815	30.22	29.22	50.2	65.0	53.9	56.4	80	32	67.7	44.9	47	53	50	50	89	67	87	81	.94	0.26
O ..	29.736	30.27	29.13	42.4	55.1	45.1	47.5	72	24	58.7	38.0	37	39	39	38	83	57	79	73	1.98	0.80
N ..	29.737	30.60	28.99	32.6	43.1	34.6	36.8	69	7	47.1	27.5	26	26	27	26	80	55	76	70	3.02	1.13
D ..	29.798	30.70	28.84	23.9	32.3	26.6	27.6	56	-3	35.4	20.2	19	21	19	20	82	67	76	75	3.30	1.09
Y ..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

Monthly and yearly meteorological summaries—Continued.

LYNCHBURGH, VA.

[$H=652$. $T=56$. $h=49$.]

Cloudiness (in tenths).				Wind.													Number of days—										
7 a. m.	3 p. m.	10 p. m.	Mean.	Total (miles).	Maximum.	Direction.	Prevailing direction.	North.	Northeast.	East.	Southeast.	South.	Southwest.	West.	Northwest.	Calms.	Clear.	Fair.	Cloudy.	Foggy.	Rain or snow.	Max. below 32°.	Min. below 32°.	Max. above 90°.	Thunder-storms.	Auroras.	Months and year.
5.7	5.0	3.3	4.7	3,156	25	W.	SW.	1	4	6	1	20	22	10	15	14	13	9	9	0	10	9	23	0	0	0	J.
7.5	7.5	6.2	7.1	3,004	24	NW.	SW.	5	19	8	2	9	20	7	11	3	2	12	14	0	11	1	8	0	0	0	F.
5.2	5.4	4.3	5.0	4,537	24	NW.	NW.	3	17	7	0	7	12	14	33	0	8	15	8	0	9	0	10	0	0	0	M.
5.4	5.5	4.3	5.1	2,882	24	NW.	SW. NW.	3	13	3	4	15	16	8	16	12	8	15	7	0	13	0	2	0	5	0	A.
5.1	6.4	3.9	5.1	2,177	17	NW.	E.	1	11	21	14	19	10	3	11	3	10	11	10	0	11	0	0	1	4	0	M.
4.1	6.5	3.4	4.7	2,004	24	S.	NE.	5	17	7	4	8	16	9	6	18	11	13	6	0	11	0	0	4	4	0	J.
4.5	5.9	4.7	5.0	1,052	20	S., N.	S.	2	3	7	7	12	11	7	3	41	8	16	7	0	11	0	0	18	7	0	J.
5.1	5.0	4.1	4.7	1,927	24	NW.	S.	3	14	14	8	15	9	8	6	16	12	11	8	0	13	0	0	10	6	0	A.
5.6	5.7	4.4	5.2	1,677	15	NE.	NE.	0	21	11	2	15	8	2	6	25	9	11	10	0	9	0	0	3	1	0	S.
4.7	5.2	3.9	4.6	2,294	23	NW.	W.	6	11	3	1	15	12	17	7	21	13	8	10	0	10	0	1	0	0	0	O.
4.6	3.6	2.8	3.7	2,280	24	NW.	SW.	2	6	2	1	7	15	13	11	33	14	11	5	0	6	0	9	0	2	0	N.
6.1	6.0	5.1	5.7	2,082	26	NW.	NW.	4	14	6	1	2	16	5	20	31	8	12	11	0	14	3	18	0	0	0	D.
5.3	5.6	4.2	5.0	29,072	..	.....	SW.	35	150	89	45	144	167	103	145	217	116	144	105	0	128	13	71	36	29	0	Y.

MACKINAW CITY, MICH.

[$H=605$. $T=41$. $h=33$.]

6.8	6.9	4.9	6.2	8,529	40	E.	W.	16	2	7	9	10	12	23	12	2	5	15	11	0	19	25	31	0	0	1	J.
5.7	6.9	5.4	6.0	8,405	59	E.	E., W.	5	1	23	12	2	7	23	5	6	6	11	11	0	15	23	28	0	0	7	F.
6.0	5.6	2.9	4.8	6,137	40	E.	W.	7	6	11	6	1	2	23	19	18	10	15	6	0	6	18	31	0	0	3	M.
6.5	6.1	4.6	5.7	7,760	46	SE.	E.	3	2	16	13	1	12	12	14	17	9	10	11	0	11	1	23	0	4	1	A.
3.9	3.5	2.4	3.3	6,262	36	S., SW.	SE.	0	4	16	24	3	10	12	18	6	15	13	3	0	9	0	1	0	3	2	M.
6.0	5.6	5.4	5.7	5,517	47	SE.	SE.	7	6	10	22	3	8	11	14	9	6	12	12	0	14	0	0	0	2	1	J.
5.4	4.6	3.5	4.5	6,160	37	SW.	W.	9	3	7	11	7	11	18	16	11	12	14	5	0	14	0	0	0	3	4	J.
4.7	4.3	3.3	4.1	5,863	37	W.	NW.	16	10	4	11	10	4	11	20	7	13	14	4	0	8	0	0	0	1	0	A.
4.3	4.4	2.7	3.8	7,765	39	W.	SE.	3	11	10	21	4	1	11	15	4	12	14	4	0	9	0	0	0	0	1	S.
7.6	7.1	6.2	7.0	10,631	57	E.	NW.	6	3	7	5	15	15	12	27	3	5	10	16	0	15	1	9	0	0	0	O.
6.8	7.1	6.5	6.8	10,393	36	SW. NW.	NW.	11	7	8	13	6	17	9	18	1	7	7	16	0	14	5	22	0	0	0	N
8.5	8.8	9.5	8.9	10,969	60	SE.	NW.	9	9	14	14	10	13	5	17	2	0	6	25	0	19	17	31	0	0	0	D.
6.0	5.9	4.8	5.6	94,391	..	.....	NW.	92	64	133	161	72	122	170	195	86	100	141	124	0	153	90	176	0	13	20	Y.

FORT MAGINNIS, MONT.

[$H=4,320$. $T=7$. $h=1$.]

6.4	6.2	4.8	5.8	12,413	64	W.	NW.	4	0	0	6	0	3	24	51	5	6	15	10	0	10	15	31	0	0	0	J.
5.5	6.5	3.2	5.1	7,825	84	NW.	NW.	2	3	0	8	2	6	16	26	21	7	14	7	0	6	18	27	0	0	0	F.
5.3	6.5	4.4	5.4	10,339	64	NW.	NW.	9	3	2	1	1	3	7	72	0	10	15	6	0	9	3	14	0	0	0	O.
6.1	7.3	6.5	6.6	8,717	52	NW.	NW.	8	5	7	4	2	2	20	33	9	1	14	15	0	14	0	18	0	0	1	A.
3.7	4.7	4.5	4.3	10,383	48	NW.	NW.	5	2	1	7	5	13	13	47	0	13	13	5	0	6	0	4	0	0	0	M.
4.1	5.9	5.6	5.2	7,945	47	NW.	NW.	9	8	6	15	2	7	6	37	0	6	19	5	0	15	0	0	0	5	0	J.
2.3	4.0	3.7	3.3	6,670	42	NW.	NW.	13	4	9	11	3	2	8	42	1	13	16	2	0	11	0	0	1	2	0	J.
4.6	5.0	5.6	5.1	5,957	40	NW. N., NE.	NW.	22	8	6	9	0	1	3	43	1	10	11	10	0	13	0	0	0	9	0	A.
4.6	3.8	2.7	3.7	7,145	57	NW.	NW.	22	10	6	6	1	1	2	42	0	14	11	5	0	6	0	2	0	2	3	S.
5.8	5.1	3.8	4.9	9,725	60	NW.	NW.	9	3	2	2	1	1	3	72	0	10	15	6	0	9	3	14	0	0	0	O.
6.3	6.7	4.3	5.8	9,781	69	NW.	NW.	10	5	0	4	0	3	7	61	0	6	15	9	0	5	8	19	0	0	0	N.
7.4	7.9	5.8	7.0	6,762	57	NW.	NW.	6	7	3	2	0	2	10	34	3	2	7	12	0	7	8	18	0	0	0	D.
5.2	5.8	4.6	5.2	103,662	..	.....	NW.	112	56	40	83	16	49	140	517	56	95	167	93	0	111	54	155	1	18	4	Y.

MANCHESTER, N. H.

[$H=249$. $T=76$. $h=68$.]

...	...	...	...	.....	..	.....	.....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	J.
...	...	...	...	.....	..	.....	.....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	F.
6.0	6.1	5.3	5.8	6,932	44	NW.	NW.	7	3	3	3	5	4	14	51	3	6	15	10	0	9	8	29	0	0	0	M.
4.7	5.3	4.5	4.8	5,137	31	W.	NW.	11	3	7	7	7	3	19	32	1	12	9	9	0	12	1	17	0	0	0	A.
4.4	4.9	3.6	4.3	3,773	24	NW.	S.	7	8	12	17	18	9	6	15	1	12	13	6	0	6	0	0	0	2	0	M.
5.5	6.2	4.5	5.4	3,283	18	E.	NW.	6	7	9	15	14	7	8	22	2	8	12	10	0	10	0	0	1	3	0	J.
6.9	6.8	4.5	6.1	3,562	24	NW.	S.	7	4	2	13	22	18	16	10	1	5	16	10	0	16	0	0	3	2	0	J.
3.9	5.5	3.1	4.2	3,345	21	NW.	NW.	15	0	6	8	16	7	15	22	4	10	16	5	0	12	0	0	0	1	0	A.
3.0	5.3	3.5	3.9	3,295	24	NW.	N.	20	2	3	4	12	13	13	19	4	11	15	4	0	8	0	0	0	0	0	S.
3.4	5.4	5.8	4.9	3,936	32	W	NW.	2	3	2	6	6	23	18	33	0	9	15	7	0	6	0	8	0	1	0	O.
4.7	4.8	3.6	4.4	4,444	28	SW.	NW.	4	1	3	6	7	18	13	31	7	13	9	8	1	9	1	19	0	0	0	N.
6.1	6.2	4.6	5.6	4,953	31	SE.	NW.	15	2	2	5	2	9	20	37	1	7	15	9	0	13	10	27	0	0	0	D.
...	...	...	...	.....	..	.....	.....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	Y.

Monthly and yearly meteorological summaries—Continued.

MARQUETTE, MICH.

[Latitude, 46° 34′ N.; longitude, 87° 24′ W.]

Months and year.	Pressure. Mean.	Pressure. Maximum.	Pressure. Minimum.	Temperature. 7 a. m.	Temperature. 3 p. m.	Temperature. 10 p. m.	Temperature. Mean.	Temperature. Maximum.	Temperature. Minimum.	Temperature. Mean. Maximum.	Temperature. Mean. Minimum.	Dew point. 7 a. m.	Dew point. 3 p. m.	Dew point. 10 p. m.	Dew point. Mean.	Relative humidity. 7 a. m.	Relative humidity. 3 p. m.	Relative humidity. 10 p. m.	Relative humidity. Mean.	Precipitation. Total.	Precipitation. Max. 24 hours.
	In.	In.	In.	°	°	°	°	°	°	°	°	°	°	°	°					In.	In.
J..	29.183	29.79	28.45	5.6	11.4	7.1	8.0	37	-21	16.2	-0.1	0	4	1	2	79	73	77	76	1.96	0.71
F..	29.386	30.10	28.53	8.4	15.9	11.6	12.0	36	-13	20.1	2.4	3	9	6	6	79	74	77	77	1.36	0.57
M.	29.361	30.06	28.77	15.5	22.1	18.5	18.7	46	-14	28.1	10.2	11	15	13	13	81	73	80	78	0.31	0.06
A..	29.178	29.68	28.44	32.6	39.8	34.2	35.5	82	9	45.0	27.8	26	31	28	29	79	74	80	78	3.44	1.37
M.	29.231	29.56	28.62	55.1	59.4	55.9	56.8	88	33	68.8	47.6	47	48	48	48	76	68	75	73	1.04	0.31
J..	29.237	29.64	28.84	57.9	63.2	57.4	59.5	91	40	69.8	50.1	52	54	52	53	81	74	84	80	3.15	2.19
J..	29.219	29.48	28.87	65.0	68.9	63.8	65.9	97	46	75.9	56.6	58	58	58	58	80	71	81	78	2.62	0.60
A..	29.298	29.50	29.01	57.8	65.3	59.1	60.7	89	41	69.0	52.5	52	54	52	53	81	70	78	76	2.90	1.06
S..	29.350	29.74	28.78	50.9	59.3	52.6	54.3	82	33	62.5	45.6	44	46	45	45	79	64	75	72	1.06	0.44
O..	29.232	29.76	28.63	38.2	44.1	38.9	40.4	77	12	47.5	33.2	32	33	32	32	78	66	76	73	2.43	0.56
N..	29.270	30.15	28.48	29.5	33.4	30.6	31.2	64	-5	37.2	23.9	23	25	23	24	77	72	74	74	3.03	0.55
D..	29.269	29.84	28.75	23.1	26.4	24.7	24.7	42	4	28.9	19.2	17	19	18	18	77	74	77	76	2.32	0.42
Y..	29.268	30.15	28.44	36.6	42.4	37.9	39.0	97	-21	47.4	30.8	30	33	31	32	79	71	78	76	25.62	.....

MEMPHIS, TENN.

[Latitude, 35° 9′ N.; longitude 90° 3′.]

Months and year.	Pressure. Mean.	Pressure. Maximum.	Pressure. Minimum.	Temperature. 7 a. m.	Temperature. 3 p. m.	Temperature. 10 p. m.	Temperature. Mean.	Temperature. Maximum.	Temperature. Minimum.	Temperature. Mean. Maximum.	Temperature. Mean. Minimum.	Dew point. 7 a. m.	Dew point. 3 p. m.	Dew point. 10 p. m.	Dew point. Mean.	Relative humidity. 7 a. m.	Relative humidity. 3 p. m.	Relative humidity. 10 p. m.	Relative humidity. Mean.	Precipitation. Total.	Precipitation. Max. 24 hours.
J..	29.763	30.31	29.04	35.0	45.5	40.4	40.3	72	4	49.4	32.1	28	33	33	32	77	65	75	73	5.00	3.08
F..	29.828	30.21	29.17	46.3	51.6	49.2	49.0	74	26	57.8	41.6	42	44	43	43	87	76	81	82	8.37	2.35
M.	29.722	29.99	29.47	47.2	59.5	54.3	53.7	77	30	63.1	45.8	41	44	42	42	80	58	65	68	4.18	2.82
A..	29.699	30.07	29.15	55.3	71.3	64.3	63.6	87	38	74.2	53.7	45	44	46	45	68	40	54	54	2.34	1.22
M.	29.637	29.86	29.35	66.6	81.2	71.9	73.2	90	54	83.7	64.2	61	62	63	62	84	54	75	71	2.83	1.22
J..	29.659	29.83	29.44	71.1	83.8	76.1	77.0	97	56	87.3	67.0	63	63	66	64	77	53	72	68	1.04	0.37
J..	29.664	29.83	29.49	74.8	87.5	79.9	80.7	99	67	91.1	72.5	71	70	73	72	88	58	80	76	3.30	1.22
A..	29.643	29.81	29.50	72.0	86.7	77.9	78.9	98	59	89.4	70.6	67	68	67	68	85	56	70	70	1.21	0.50
S..	29.712	29.91	29.30	65.8	82.7	73.1	73.9	99	49	84.8	64.8	57	60	64	61	76	49	76	67	2.15	1.21
O..	29.770	30.02	29.53	51.5	69.3	59.7	60.2	88	33	71.4	50.1	48	49	47	48	86	51	65	67	2.24	1.85
N..	29.799	30.28	29.44	43.8	50.9	50.8	51.5	76	18	63.1	41.0	36	35	40	37	74	43	69	62	4.06	1.65
D..	29.771	30.35	29.20	36.4	44.7	40.8	40.6	62	14	48.0	34.0	32	32	32	32	84	64	73	74	5.80	1.59
Y..	29.722	30.35	29.04	55.5	68.6	61.5	61.9	99	4	71.9	53.1	49	50	51	50	80	56	71	69	42.52	.....

MILWAUKEE, WIS.

[Latitude 43°, 2′ N.; longitude, 87° 54′, W.]

Months and year.	Pressure. Mean.	Pressure. Maximum.	Pressure. Minimum.	Temperature. 7 a. m.	Temperature. 3 p. m.	Temperature. 10 p. m.	Temperature. Mean.	Temperature. Maximum.	Temperature. Minimum.	Temperature. Mean. Maximum.	Temperature. Mean. Minimum.	Dew point. 7 a. m.	Dew point. 3 p. m.	Dew point. 10 p. m.	Dew point. Mean.	Relative humidity. 7 a. m.	Relative humidity. 3 p. m.	Relative humidity. 10 p. m.	Relative humidity. Mean.	Precipitation. Total.	Precipitation. Max. 24 hours.
J..	29.172	29.68	28.39	11.5	17.0	14.2	14.2	42	-16	23.2	4.4	7	12	10	10	83	81	82	82	2.66	1.12
F..	29.341	30.02	28.32	19.6	24.9	23.8	22.8	49	-9	30.2	14.2	16	21	20	19	85	85	86	85	3.22	0.99
M.	29.313	29.88	28.74	25.5	32.3	29.9	29.2	57	4	36.9	22.4	20	25	22	22	80	75	73	76	1.25	1.00
A..	29.175	29.67	28.47	38.0	46.1	43.2	42.4	78	18	52.2	35.5	31	34	33	33	77	65	69	70	1.05	0.52
M.	29.233	29.54	28.84	53.7	60.2	56.8	56.9	80	42	66.1	48.9	43	47	46	46	69	64	70	67	1.80	0.75
J..	29.236	29.62	28.92	59.0	66.7	62.8	62.8	92	47	72.4	54.3	53	56	54	54	80	69	75	75	0.81	0.23
J..	29.225	29.41	28.96	68.4	76.8	72.1	72.4	100	52	81.0	64.3	61	63	61	62	79	65	70	71	5.21	2.98
A..	29.266	29.47	29.05	62.2	70.8	66.6	66.5	93	47	74.2	60.0	56	59	58	58	82	67	77	75	2.25	1.27
S..	29.326	26.70	28.91	57.2	64.4	59.6	60.4	86	38	67.8	53.6	51	52	52	52	81	67	77	75	4.36	1.42
O..	29.265	29.74	28.64	40.4	50.8	45.5	45.6	74	15	54.4	38.2	34	37	36	36	78	62	70	70	2.43	0.94
N..	29.270	30.01	28.45	32.6	40.2	34.8	35.9	69	-4	43.8	28.8	28	28	28	28	85	64	79	76	0.85	0.32
D..	29.243	29.88	28.59	23.8	28.3	25.9	26.0	53	-7	33.1	19.7	20	23	22	22	88	82	86	86	4.57	0.87
Y.	29.255	30.02	28.32	41.0	48.2	44.6	44.6	100	-16	52.9	37.0	35	38	37	37	81	70	76	76	30.46	.....

MOBILE, ALA.

[Latitude, 30° 41′ N.; longitude, 88°; 2′ W.]

Months and year.	Pressure. Mean.	Pressure. Maximum.	Pressure. Minimum.	Temperature. 7 a. m.	Temperature. 3 p. m.	Temperature. 10 p. m.	Temperature. Mean.	Temperature. Maximum.	Temperature. Minimum.	Temperature. Mean. Maximum.	Temperature. Mean. Minimum.	Dew point. 7 a. m.	Dew point. 3 p. m.	Dew point. 10 p. m.	Dew point. Mean.	Relative humidity. 7 a. m.	Relative humidity. 3 p. m.	Relative humidity. 10 p. m.	Relative humidity. Mean.	Precipitation. Total.	Precipitation. Max. 24 hours.
J..	31.145	30.51	29.67	41.8	53.6	47.5	47.6	72	16	56.6	38.6	38	36	40	38	85	59	78	74	2.90	1.09
F..	30.177	30.54	29.78	59.4	66.7	61.3	62.5	80	36	69.5	56.2	55	56	56	56	88	72	85	82	6.62	4.22
M.	30.050	30.43	29.78	52.1	65.8	58.8	58.9	77	36	68.7	49.4	46	46	49	47	83	55	72	70	3.65	1.29
A..	30.052	30.36	29.69	58.4	74.2	66.2	66.3	86	41	76.3	55.9	53	52	56	54	84	49	72	68	1.93	1.25
M.	29.970	30.17	29.75	68.7	80.2	72.9	73.9	92	56	84.5	65.9	64	64	65	64	86	60	78	74	3.06	0.93
J..	29.959	30.12	29.80	72.9	83.1	77.2	77.7	93	63	86.7	68.8	69	70	69	69	87	66	78	77	8.91	3.26
J..	29.985	30.14	29.76	76.0	86.6	78.5	80.4	98	68	90.1	72.7	73	73	74	73	89	66	85	80	4.31	1.05
A..	29.936	30.09	29.70	74.6	85.9	79.2	79.9	93	65	89.2	72.4	71	71	73	72	90	63	82	78	4.31	2.20
S...	30.000	30.11	29.62	70.7	83.9	76.3	77.0	96	33	85.7	68.8	66	67	69	67	86	58	78	74	6.21	4.57
O..	30.010	30.22	29.26	60.1	73.3	65.9	66.4	87	34	75.0	57.6	56	58	58	58	88	62	78	76	2.45	2.08
N..	30.101	30.42	29.84	51.6	66.1	58.2	58.6	80	25	68.6	48.5	48	50	52	50	87	58	79	75	0.44	0.30
D..	30.064	30.57	29.60	47.2	54.9	50.4	50.8	69	25	57.8	43.1	43	46	47	45	87	74	88	83	7.21	2.18
Y..	30.037	30.57	29.26	61.1	72.9	66.0	66.7	98	16	75.7	58.2	57	57	59	58	87	62	79	76	52.00	.....

Monthly and yearly meteorological summaries—Continued.

MARQUETTE, MICH.

[H=672. T=64. h=58.]

Cloudiness (in tenths).				Wind.													Number of days—										
7 a. m.	3 p. m.	10 p. m.	Mean.	Total (miles).	Maximum.	Direction.	Prevailing direction.	North.	Northeast.	East.	Southeast.	South.	Southwest.	West.	Northwest.	Calms.	Clear.	Fair.	Cloudy.	Foggy.	Rain or snow.	Max. below 32°.	Min. below 32°.	Max. above 90°.	Thunder-storms.	Auroras.	Months and year.
6.8	7.0	5.2	6.3	7,773	33	W.	NW.	12	3	3	4	9	11	22	29	0	4	16	11	0	20	30	31	0	0	0	J.
7.1	6.4	4.9	6.1	6,047	33	E.	NW.	6	5	10	6	10	7	6	33	1	5	15	8	0	11	24	28	0	0	4	F.
6.4	5.5	4.2	5.4	7,334	39	NW.	NW.	20	8	2	2	15	5	7	34	0	6	18	7	0	9	17	31	0	0	2	M.
6.5	5.7	4.6	5.6	6,436	37	SW.	NW.	11	10	16	7	7	8	10	20	1	6	15	9	0	13	3	22	0	2	4	A.
3.7	3.5	2.8	3.3	5,554	36	S.	NW.	6	3	10	11	17	13	10	22	1	16	10	5	0	7	0	0	0	2	0	M.
5.7	5.3	5.3	5.4	4,329	25	W.	NW.	8	12	10	11	8	9	10	16	6	8	15	7	0	10	0	0	1	4	0	J.
4.8	4.7	4.7	4.7	5,015	30	NW.	NW.	9	7	11	8	7	9	14	26	2	10	13	8	0	15	0	0	3	2	2	J.
6.3	6.1	3.2	5.2	5,617	30	NW.	NW.	10	6	10	7	12	9	6	32	1	9	13	9	0	13	0	0	0	4	0	A.
6.2	3.7	3.6	4.5	6,212	40	NW.	NW.	10	2	5	7	13	9	13	31	0	8	17	5	0	7	0	0	0	4	3	S.
7.8	7.0	5.7	6.8	8,772	42	NW.	NW.	13	3	6	0	11	9	17	33	1	4	15	12	0	21	2	13	0	0	0	O.
7.7	7.2	6.5	7.1	7,103	35	NW., N.	NW.	9	6	1	4	12	12	17	29	0	5	9	16	0	17	6	21	0	0	0	N.
8.3	8.8	8.5	8.5	7,567	36	SW.	NW.	4	8	6	12	12	14	11	26	0	1	6	24	0	18	18	31	0	0	0	D.
6.4	5.9	4.9	5.7	77,759	..	.....	NW.	118	73	90	79	133	115	143	331	13	82	162	121	0	161	100	177	4	18	15	Y.

MEMPHIS, TENN.

[H=320 T=58. h=51.]

3.9	4.5	3.2	3.9	6,570	34	SW.	SE.	3	5	3	20	13	16	14	17	2	15	11	5	0	8	6	16	0	3	0	J.
6.9	7.0	4.5	6.1	5,018	32	W. SW.	NE.	7	20	2	14	7	8	12	12	2	7	9	12	0	15	0	5	0	5	0	F.
4.3	4.3	2.4	3.7	5,321	32	SW.	NW.	10	7	9	9	11	11	15	19	2	17	8	6	0	7	0	1	0	4	0	M.
3.5	3.0	1.4	2.6	5,241	25	NW.	SE.	2	4	4	26	9	13	15	15	2	21	7	2	0	6	0	0	0	4	0	A.
5.4	6.2	1.8	4.5	3,779	36	NW.	W., NW.	3	5	7	8	7	14	22	22	5	10	18	3	0	14	0	0	1	11	0	M.
4.3	5.9	3.2	4.5	3,568	24	SW.	NW.	4	14	14	5	4	10	14	19	6	11	11	8	0	10	0	0	10	9	0	J.
4.4	5.5	3.0	4.3	3,180	30	W.	W.	3	3	3	10	6	14	30	23	1	13	12	6	0	10	0	0	19	10	0	J.
3.9	4.6	2.1	3.5	3,889	28	W.	NW.	8	7	7	10	1	8	23	27	2	13	15	3	0	7	0	0	16	6	0	A.
5.8	6.2	2.5	4.8	3,909	23	N.	W.	12	9	14	7	9	11	15	11	2	10	14	6	0	9	0	0	12	1	0	S.
3.5	2.8	2.0	2.8	5,100	32	NW.	NW.	15	5	6	17	5	7	10	24	4	18	10	3	0	4	0	0	0	0	0	O.
4.0	3.0	2.6	3.2	4,536	36	W.	SE.	10	13	7	15	5	13	11	12	4	17	5	8	0	6	0	5	0	0	0	N.
6.1	6.6	6.2	6.3	5,142	36	W.	W.	6	17	6	20	2	4	21	15	2	6	12	13	0	14	3	13	0	1	0	D.
4.7	5.0	2.9	4.2	55,253	..	.....	NW.	83	109	82	161	79	129	202	216	34	158	132	75	0	110	9	40	58	54	0	Y.

MILWAUKEE, WIS.

[H=697. T=106. h=100.]

5.4	6.3	5.8	5.8	9,650	38	NW.	NW.	11	1	5	5	7	14	22	25	3	4	17	10	0	14	22	30	0	0	0	J.
6.3	7.4	6.9	6.9	8,748	54	W.	W.	6	5	9	11	8	5	26	14	0	5	8	15	0	16	14	28	0	1	0	F.
5.7	6.2	4.5	5.5	8,321	40	NW.	NW.	12	17	10	7	7	8	9	21	2	8	16	7	0	4	7	28	0	0	0	M.
5.7	5.7	4.5	5.3	8,273	44	NW.	SE.	8	10	11	16	8	14	11	8	4	6	17	7	0	8	0	9	0	2	0	A.
4.6	3.9	3.5	4.0	6,054	48	SW.	SE.	13	13	15	20	5	11	5	4	7	14	8	9	0	8	0	0	0	2	0	M.
3.8	5.6	3.7	4.4	4,839	29	W.	SE.	15	9	13	16	7	5	10	7	8	7	19	4	0	7	0	0	2	3	0	J.
3.9	4.7	3.5	4.0	5,870	40	W.	SE.	10	7	11	24	8	14	10	3	6	15	13	3	0	8	0	0	5	6	0	J.
5.3	5.0	5.7	5.3	6,338	48	NW.	SE.	14	18	17	23	7	4	4	5	1	9	12	10	0	11	0	0	1	4	0	A.
5.8	6.3	5.2	5.8	7,609	33	E.	SE.	7	14	12	23	6	12	5	8	3	7	11	12	0	13	0	0	0	3	0	S.
5.2	5.5	6.2	5.6	9,156	48	W., NW.	NW.	6	0	3	6	11	18	24	25	0	7	14	10	0	12	1	9	0	4	0	O.
6.3	5.2	3.5	5.0	8,938	48	W.	SW.	11	9	7	6	2	19	15	17	4	9	12	9	1	7	3	14	0	0	0	N.
7.8	7.8	6.0	7.2	9,017	48	SW.SE.	SW.	8	4	1	12	11	25	17	11	4	96	8	17	0	19	12	25	0	0	0	D.
5.5	5.8	4.9	5.4	92,813	48	.....	SE.	121	107	114	169	87	149	158	148	42	7	155	113	1	127	59	143	8	25	0	Y.

MOBILE, ALA.

[H=35. T=87. h=81.]

4.7	5.9	4.2	4.9	7,073	35	NW.	S.	20	5	4	13	24	9	0	18	0	10	12	9	0	10	1	11	0	1	0	J.
6.3	7.2	4.2	5.9	5,435	28	NW.	S.	11	3	6	19	27	7	2	9	0	4	15	9	0	9	0	0	0	2	0	F.
4.8	4.9	2.5	4.1	5,682	29	SE.	S.	18	1	3	17	24	7	6	16	1	12	14	5	0	6	0	0	0	3	0	M.
3.7	3.2	2.1	3.0	6,285	23	SW., S.	S.	15	10	1	8	28	11	6	11	0	16	12	2	0	4	0	0	0	1	0	A.
5.3	6.6	3.9	5.3	5,593	32	SW.	SW.	13	4	7	10	13	21	8	15	2	6	18	7	0	11	0	0	2	9	0	M.
5.3	5.7	4.8	5.3	5,083	27	NE.	S.	12	12	8	14	22	10	4	8	0	9	11	10	0	12	0	0	8	4	0	J.
5.5	7.0	4.4	5.6	4,593	36	NW.	NW.	8	6	3	8	11	13	16	23	5	1	25	5	0	16	0	0	16	10	0	J.
4.2	6.2	2.8	4.4	4,200	36	SE.	NW.	12	12	2	10	9	16	8	21	3	9	17	5	0	8	0	0	13	4	0	A.
4.3	5.8	2.1	4.1	5,064	43	W.	SW., NE.	12	19	7	12	3	19	7	11	0	12	14	4	0	6	0	0	7	2	0	S.
5.1	5.4	4.4	5.0	5,809	48	SE.	N.	38	8	12	14	3	2	0	16	0	9	13	9	0	8	0	0	0	0	0	O.
5.3	5.0	3.8	4.7	4,739	36	N.	N.	28	10	3	18	8	3	6	14	0	12	9	9	0	6	0	1	0	0	0	N.
7.4	7.8	5.4	6.9	6,528	35	NW., SW.	N.	31	5	7	18	5	5	4	17	1	2	14	15	0	15	0	5	0	1	0	D.
3.2	5.9	2.7	4.9	66,064	..	.....	S.	218	95	63	161	177	123	67	179	12	102	174	89	0	111	1	17	46	37	0	Y.

Monthly and yearly meteorological summaries—Continued.

MONTGOMERY, ALA.

[Latitude, 32° 23′ N.; longitude, 86° 18′ W.]

Months and year.	Pressure. Mean.	Pressure. Maximum.	Pressure. Minimum.	Temperature. 7 a. m.	Temperature. 3 p. m.	Temperature. 10 p. m.	Temperature. Mean.	Temperature. Maximum.	Temperature. Minimum.	Temperature. Mean. Maximum.	Temperature. Mean. Minimum.	Dew point. 7 a. m.	Dew point. 3 p. m.	Dew point. 10 p. m.	Dew point. Mean.	Relative humidity. 7 a. m.	Relative humidity. 3 p. m.	Relative humidity. 10 p. m.	Relative humidity. Mean.	Precipitation. Total.	Precipitation. Max. 24 hours.
	In.	In.	In.	°	°	°	°	°	°	°	°	°	°	°	°					In.	In.
J..	29.940	30.31	29.45	38.3	51.2	46.0	45.2	74	13	54.4	36.4	34	36	39	36	85	58	76	73	5.08	1.78
F..	29.987	30.34	29.51	54.8	64.0	59.1	59.3	79	34	67.5	52.7	50	53	52	52	86	70	78	78	7.47	2.03
M..	29.834	30.15	29.54	48.7	66.2	58.0	57.6	80	32	68.7	47.5	43	44	47	44	80	46	68	65	0.72	0.68
A..	29.841	30.22	29.41	55.4	75.8	66.7	66.0	87	40	77.9	54.4	50	48	53	50	83	40	63	62	1.18	0.59
M	29.764	30.00	29.55	68.5	83.3	75.2	75.7	92	60	86.6	66.5	63	63	65	64	83	53	71	69	2.84	0.81
J.	29.769	29.96	29.59	72.9	87.8	79.1	79.9	102	62	91.0	71.0	66	64	68	66	80	49	70	66	3.31	1.72
J..	29.773	29.95	29.37	74.2	87.1	77.7	79.7	100	70	90.7	72.8	71	72	73	72	90	63	86	80	8.56	2.25
A..	29.743	29.92	29.51	72.4	88.0	77.4	79.3	96	59	90.4	71.4	70	71	72	71	91	58	85	78	2.04	0.63
S..	29.826	29.96	29.39	67.4	84.0	75.7	75.7	98	50	85.8	65.4	61	61	63	62	80	49	65	65	2.03	0.99
O..	29.839	30.04	29.43	55.8	71.3	63.4	63.5	86	32	73.1	54.4	51	52	53	52	84	55	70	70	2.47	1.62
N..	29.914	30.29	29.58	47.3	65.5	55.9	56.2	79	21	67.4	44.8	42	41	44	43	84	44	67	65	0.79	0.40
D..	29.890	30.38	29.26	43.4	52.2	47.7	47.8	68	22	54.6	39.5	40	37	39	38	82	60	74	72	8.25	1.62
Y..	29.843	30.38	29.26	58.3	73.0	65.2	65.5	102	13	75.7	56.4	53	54	56	54	84	54	73	70	44.74	.....

MONTROSE, COLO.

[Latitude, 38° 30′ N.; longitude, 107° 56′ W.]

Months and year.	Pressure. Mean.	Pressure. Maximum.	Pressure. Minimum.	Temperature. 7 a. m.	Temperature. 3 p. m.	Temperature. 10 p. m.	Temperature. Mean.	Temperature. Maximum.	Temperature. Minimum.	Temperature. Mean. Maximum.	Temperature. Mean. Minimum.	Dew point. 7 a. m.	Dew point. 3 p. m.	Dew point. 10 p. m.	Dew point. Mean.	Relative humidity. 7 a. m.	Relative humidity. 3 p. m.	Relative humidity. 10 p. m.	Relative humidity. Mean.	Precipitation. Total.	Precipitation. Max. 24 hours.
J..	24.255	24.67	23.91	20.9	34.9	26.7	27.5	60	2	39.4	14.7	14	21	18	18	73	59	69	67	0.16	0.10
F..	24.211	24.76	23.89	27.8	41.7	31.4	33.6	59	2	45.5	22.1	17	21	20	20	68	49	66	61	0.24	0.07
M..	24.344	24.59	24.03	32.4	55.2	42.8	43.5	72	16	59.1	28.7	20	22	21	22	62	30	50	47	0.28	0.20
A..	24.223	24.48	23.88	36.2	55.8	47.0	46.3	78	21	60.1	33.5	26	21	27	25	67	30	49	49	1.21	0.78
M	24.270	24.56	23.97	45.4	70.3	60.3	58.7	89	28	74.2	43.1	28	24	30	27	51	20	36	36	0.07	0.04
J..	24.244	24.44	24.07	55.2	81.2	71.7	69.4	93	41	85.0	52.9	33	28	38	33	44	17	31	31	0.04	0.02
J..	24.389	24.56	24.25	58.5	80.6	72.1	70.4	94	48	84.8	56.0	41	44	47	44	56	32	46	45	1.34	0.52
A..	24.333	24.49	24.15	55.0	78.2	68.5	67.2	90	42	82.1	52.8	40	45	48	44	59	34	53	49	2.12	0.52
S..	24.374	24.52	24.15	50.0	71.4	61.4	60.9	84	39	74.9	48.5	35	49	44	43	58	48	55	54	1.56	0.56
O..	24.362	24.69	23.78	37.0	59.0	47.6	47.9	83	23	62.5	35.4	22	34	30	29	57	42	54	51	1.19	0.83
N..	24.357	24.59	23.92	27.9	48.4	35.4	37.2	65	8	51.7	25.7	16	31	22	23	62	52	59	58	1.08	0.60
D..	24.292	24.59	23.78	14.0	29.9	18.4	20.8	47	-16	33.3	8.6	5	15	8	9	67	55	66	63	0.35	0.15
Y..	24.305	24.76	23.78	38.4	58.9	48.6	48.6	94	-16	62.7	35.0	25	30	30	28	60	39	53	51	9.64	.....

MOORHEAD, MINN.

[Latitude, 46° 52′ N.; longitude, 96° 44′ W.]

Months and year.	Pressure. Mean.	Pressure. Maximum.	Pressure. Minimum.	Temperature. 7 a. m.	Temperature. 3 p. m.	Temperature. 10 p. m.	Temperature. Mean.	Temperature. Maximum.	Temperature. Minimum.	Temperature. Mean. Maximum.	Temperature. Mean. Minimum.	Dew point. 7 a. m.	Dew point. 3 p. m.	Dew point. 10 p. m.	Dew point. Mean.	Relative humidity. 7 a. m.	Relative humidity. 3 p. m.	Relative humidity. 10 p. m.	Relative humidity. Mean.	Precipitation. Total.	Precipitation. Max. 24 hours.
J..	28.892	29.58	28.23	-14.3	-4.7	-9.0	-9.3	30	-48	1.3	-21.6	-20	-12	-15	-16	75	68	75	73	0.48	0.32
F..	29.136	29.86	28.59	-7.6	3.3	-1.1	-1.8	39	-35	7.3	-12.0	-13	-5	-7	-8	77	69	77	74	0.58	0.48
M..	29.099	29.76	28.46	16.2	27.2	22.6	22.0	46	-19	31.8	12.8	11	17	17	15	78	65	77	74	0.26	0.15
A.	28.876	29.26	28.26	33.0	49.1	41.6	41.2	86	4	54.1	29.7	28	36	34	33	80	64	76	73	2.45	0.59
M	28.861	29.46	28.22	51.8	69.6	58.7	60.0	96	25	75.4	45.2	44	46	46	45	76	47	65	63	2.57	0.36
J..	28.883	29.19	28.53	60.9	76.3	67.0	68.1	95	36	79.4	54.2	55	56	58	57	83	53	74	70	3.77	1.36
J..	28.928	29.13	28.68	60.2	77.4	69.1	68.9	96	42	80.4	57.6	58	63	63	61	91	62	81	78	6.40	1.51
A..	28.962	29.19	28.57	54.4	71.1	62.6	62.7	84	37	73.5	52.2	52	57	56	55	92	62	80	78	1.45	0.60
S..	29.012	29.43	28.43	47.1	65.7	55.4	56.1	84	23	68.6	44.4	43	47	46	46	87	54	72	71	0.30	0.12
O..	29.001	29.59	28.33	30.3	46.4	38.4	38.4	74	6	48.6	27.8	24	30	28	28	80	56	69	68	1.40	0.34
N..	29.031	29.68	28.39	19.6	32.6	25.6	25.9	72	-22	36.2	15.4	15	19	18	18	83	62	76	74	0.57	0.16
D..	29.037	29.74	28.47	2.7	9.0	6.4	6.0	36	-36	15.1	-3.5	-0	6	4	3	91	86	85	87	1.74	0.61
Y..	28.977	29.86	28.22	29.5	43.6	36.4	36.5	96	-48	47.6	25.2	25	30	29	28	83	62	76	74	21.97	.....

NANTUCKET, MASS.

[Latitude, 41° 17′ N.; longitude, 70° 6′ W.]

Months and year.	Pressure. Mean.	Pressure. Maximum.	Pressure. Minimum.	Temperature. 7 a. m.	Temperature. 3 p. m.	Temperature. 10 p. m.	Temperature. Mean.	Temperature. Maximum.	Temperature. Minimum.	Temperature. Mean. Maximum.	Temperature. Mean. Minimum.	Dew point. 7 a. m.	Dew point. 3 p. m.	Dew point. 10 p. m.	Dew point. Mean.	Relative humidity. 7 a. m.	Relative humidity. 3 p. m.	Relative humidity. 10 p. m.	Relative humidity. Mean.	Precipitation. Total.	Precipitation. Max. 24 hours.
J..	30.002	30.63	29.34	30.8	34.7	32.0	32.5	54	5	40.2	24.8	27	30	28	28	87	82	84	85	2.97	0.72
F..	30.165	30.87	29.23	31.6	34.6	33.4	33.2	52	14	40.2	37.3	27	29	30	29	82	81	87	84	3.97	0.91
M..	29.848	30.80	29.04	31.4	35.8	32.8	33.3	52	6	38.8	26.5	27	29	28	28	82	78	82	82	2.84	1.12
A..	29.943	30.66	29.15	20.9	45.9	41.1	42.6	67	25	48.8	35.1	34	36	35	35	78	70	82	76	6.23	1.70
M	30.062	30.37	29.56	53.7	59.4	51.8	55.0	77	42	61.7	48.2	47	47	47	47	79	66	85	77	1.75	1.20
J..	30.021	30.31	29.65	59.5	64.8	58.1	60.8	79	47	66.7	54.4	55	55	54	55	85	72	87	81	2.12	1.47
J..	29.986	30.24	29.60	68.8	74.4	67.5	70.2	84	58	76.1	64.6	65	66	64	65	90	77	91	86	2.10	1.02
A..	29.966	30.26	29.72	66.6	70.4	65.2	67.4	83	53	71.7	61.6	61	60	60	61	84	72	85	80	4.35	1.46
S..	30.078	30.44	29.61	59.7	63.1	58.8	60.5	72	47	65.2	55.4	53	53	53	53	80	72	83	78	1.99	0.83
O..	29.993	30.46	29.38	52.6	55.8	52.1	53.5	67	39	57.9	48.3	46	47	46	47	80	74	82	79	1.81	0.83
N..	30.000	30.71	29.29	42.5	47.6	44.0	44.7	60	28	.....	37.6	37	39	37	37	80	73	77	77	2.54	1.00
D..	30.042	30.83	28.88	35.5	38.4	36.5	36.8	58	13	42.8	30.4	30	32	30	31	81	78	78	79	4.60	2.20
Y..	30.009	30.87	28.88	47.8	52.1	47.8	49.2	84	5	.....	42.8	42	44	43	43	83	75	84	80	37.27	.....

Monthly and yearly meteorological summaries—Continued.

MONTGOMERY, ALA.

[H=217. T=68. h=60.]

Cloudiness (in tenths).				Wind.													Number of days—									
7 a. m.	3 p. m.	10 p. m.	Mean.	Total (miles).	Maximum.	Direction.	Prevailing direction.	North.	Northeast.	East.	Southeast.	South.	Southwest.	West.	Northwest.	Calms.	Clear.	Fair.	Cloudy.	Foggy.	Rain or snow.	Max. below 32°.	Min. below 32°.	Max. above 90°.	Thunder-storms.	Auroras.	Months and year.
4.2	4.9	3.2	4.1	5,070	31	NW.	S.	10	7	2	19	21	9	6	17	2	12	14	5	0	9	2	11	0	2	0	J.
7.6	7.8	5.7	7.0	4,564	28	W.	E., SE.	7	3	16	16	12	9	13	7	1	3	10	15	0	10	0	0	0	2	0	F.
3.5	3.4	2.7	3.2	4,715	24	NW.	S., NW.	10	5	2	8	21	13	11	21	2	15	13	3	0	3	0	0	0	1	0	M.
2.8	3.7	2.4	3.0	4,123	22	W.	W. S.	8	2	12	8	14	12	14	13	7	16	11	3	0	5	0	0	0	1	0	A.
4.3	7.5	3.5	5.1	3,403	40	NW.	SE.	7	4	9	20	7	12	14	11	9	7	15	9	0	12	0	0	7	13	0	M.
3.4	5.1	4.5	4.3	3,768	20	E.	E.	10	11	18	8	12	14	7	7	3	12	11	7	0	8	0	0	19	7	0	J.
5.2	6.7	6.1	6.0	3,685	28	NE.	SW.	12	7	9	10	9	18	13	12	3	6	14	11	0	15	0	0	15	15	0	J.
3.1	4.5	3.3	3.6	3,172	24	SE. NE. SW.	NE.	10	23	15	6	6	14	12	6	1	14	14	3	0	7	0	0	24	9	0	A.
3.2	5.2	2.7	3.7	3,676	23	E.	E.	5	16	33	12	4	3	7	1	9	18	6	6	0	4	0	0	10	0	0	S.
4.0	5.0	3.2	4.1	4,123	14	NE.	NE.	18	22	17	6	2	4	3	14	7	15	7	9	0	10	0	0	0	0	0	O.
4.3	3.4	3.8	3.8	3,203	24	NW.	NE.	8	13	12	12	6	10	9	10	10	15	5	10	0	4	0	3	0	0	0	N.
7.5	7.3	6.7	7.2	4,939	24	SE. E. NW.	E.	11	9	23	12	3	9	10	15	1	6	6	19	0	16	0	7	0	0	0	D.
4.4	5.4	4.0	4.6	48,441	..	.....	E.	116	122	168	137	117	127	119	134	55	139	126	100	0	103	2	21	75	50	0	Y.

MONTROSE, COLO.

[H=5780. T=17. h=1.]

1.9	5.1	5.2	5.1	4,455	34	SW.	SE.	7	7	13	25	15	8	9	7	2	7	18	6	0	6	5	31	0	0	0	J.
4.5	5.3	4.4	4.7	6,634	50	SW.	SW.	5	3	15	15	13	20	5	7	1	11	10	7	0	7	1	24	0	0	0	F.
2.2	3.0	3.4	2.9	4,759	40	NW.	SE.	7	9	9	31	9	6	9	12	1	19	7	5	0	3	0	21	0	0	0	M.
3.2	5.4	4.9	4.5	5,126	36	S., SW.	SE., S.	6	5	5	17	17	13	7	10	10	11	12	7	0	6	0	10	0	0	0	A.
1.6	4.2	3.5	3.1	5,640	36	E.	S.	3	5	9	12	17	14	6	12	15	17	12	2	0	3	0	3	0	0	0	M.
2.1	4.1	2.4	2.9	6,094	40	SE.	SW.	7	4	7	18	18	22	5	3	6	16	14	0	0	2	0	0	4	6	0	J.
2.1	5.7	3.3	3.7	4,646	32	SW.	SE.	5	2	11	19	18	13	11	11	3	18	8	5	0	11	0	0	8	3	0	J.
2.8	4.7	2.6	3.4	4,617	36	NW.	S.	3	3	7	19	32	5	9	12	3	16	9	4	0	12	0	0	3	2	0	A.
2.1	3.2	1.6	2.3	3,955	30	NE.	SE.	13	1	2	28	24	12	3	5	2	19	9	2	0	7	0	0	0	0	0	S.
0.9	2.2	1.2	1.4	3,733	34	NW.	SE.	17	4	4	28	23	4	3	8	2	25	5	1	0	3	0	13	0	0	0	O.
2.2	3.8	2.4	2.8	3,149	24	SW.	SE.	12	2	7	32	15	6	1	13	2	20	4	6	0	6	1	26	0	0	0	N.
2.5	4.6	3.3	3.5	3,352	42	SW.	S.	6	4	16	23	25	6	1	11	1	14	13	4	0	6	10	31	0	0	0	D.
2.6	4.3	3.2	3.4	56,160	..	.....	SE.	91	45	105	267	226	129	69	111	48	193	121	49	0	72	17	159	15	11	0	Y.

MOORHEAD, MINN.

[H=926. T=51. h=40.]

4.3	6.8	5.0	5.0	6,039	49	S.	S.	18	6	1	2	20	6	5	18	2	6	13	7	0	7	26	26	0	0	1	J.
6.9	6.1	4.8	5.9	6,007	45	SE.	NW.	15	10	0	9	12	6	4	20	8	6	13	9	0	8	27	28	0	0	1	F.
5.3	7.8	4.7	5.9	7,546	41	S.	N.	25	17	0	11	17	4	1	9	9	5	18	8	0	8	13	31	0	0	0	M.
6.4	6.4	5.7	6.2	10,162	49	S.	N.	31	13	3	16	11	4	4	8	0	5	12	13	0	14	1	18	0	4	2	A.
5.5	5.9	3.7	5.0	10,553	61	SE.	N.	24	9	3	14	17	15	4	7	0	10	11	10	0	10	0	1	3	6	1	M.
5.0	6.2	4.0	5.1	9,349	49	S.	SE.	13	10	3	26	19	1	6	10	2	12	9	9	0	11	0	0	2	7	1	J.
4.7	5.2	4.6	4.8	6,244	60	NW.	N.	30	12	4	7	18	7	3	9	3	7	17	7	0	15	0	0	2	10	0	J.
5.6	5.9	5.3	5.6	6,515	42	S.	SE.	19	10	4	21	16	7	1	9	6	4	17	10	0	5	0	0	0	2	2	A.
4.5	4.8	2.9	4.1	7,900	48	SE., S.	S.	16	3	1	14	27	7	4	11	7	11	13	6	0	5	0	4	0	2	4	S.
4.2	6.2	4.5	5.0	7,753	38	SE.	NW.	16	7	2	5	13	12	8	24	6	9	14	8	0	8	2	20	0	2	3	O.
3.9	5.5	5.0	4.8	6,747	42	N.	S.	18	6	0	7	21	7	5	15	11	10	14	6	0	9	11	27	0	1	1	N.
5.7	7.6	5.4	6.2	7,670	38	NW.	N.	30	3	2	4	22	2	1	12	17	5	14	12	0	14	29	31	0	0	3	D.
5.2	6.2	4.6	5.3	92,485	..	.....	N.	255	106	23	136	213	78	46	152	71	90	165	105	0	114	109	186	8	34	19	Y.

NANTUCKET, MASS.

[H=14. T=7. h=41.]

5.3	6.8	6.3	6.1	9,193	33	NW.	NW.	10	7	5	3	7	23	10	26	2	8	11	12	0	16	6	24	0	0	0	J.
5.5	5.7	5.4	5.5	9,304	40	NW.	NW.	6	18	2	7	9	11	5	26	0	6	15	7	0	14	5	22	0	1	0	F.
6.0	5.9	5.7	5.9	10,517	41	SE.	NW.	23	19	3	3	7	6	7	25	0	6	14	11	0	14	3	27	0	0	0	M.
4.6	5.4	3.7	4.6	8,575	53	NE.	W.	13	17	8	4	3	14	23	8	0	11	11	8	0	14	0	8	0	0	0	A.
4.1	4.5	2.8	3.8	5,927	22	NE.	NE.	8	23	6	11	15	19	3	8	0	14	13	4	0	6	0	0	0	1	0	M.
2.7	4.6	2.9	3.4	7,349	32	E., NE.	SW.	2	11	16	9	18	21	11	2	0	13	15	2	0	8	0	0	0	0	0	J.
4.9	5.5	2.5	4.3	6,512	23	SW.	SW.	5	6	7	7	22	27	13	6	0	10	18	3	0	5	0	0	0	1	0	J.
3.1	4.5	2.6	3.4	6,641	36	N.	SW.	8	16	12	4	12	23	14	3	1	18	8	5	0	11	0	0	0	1	0	A.
4.6	5.7	4.4	4.9	6,766	32	NE.	W.	6	19	12	7	3	15	20	8	0	10	11	9	0	10	0	0	0	0	0	S.
6.5	6.0	5.1	5.9	7,492	40	NW.	W.	10	13	12	5	3	15	19	14	0	8	12	11	0	12	0	0	0	0	0	O.
5.3	6.1	3.9	5.1	8,704	46	NE.	NW.	9	12	3	4	9	11	17	25	0	7	15	8	0	11	0	4	0	0	0	N.
6.6	6.6	5.8	6.3	9,106	36	NE., N. SE., NW	NW.	8	9	7	11	13	2	11	32	0	5	11	15	0	12	3	16	0	0	0	D.
4.9	5.6	4.3	4.9	96,086	..	.....	SW.	108	170	93	75	123	187	153	183	3	116	154	95	0	133	17	101	0	4	0	Y.

Monthly and yearly meteorological summaries—Continued.

NASHVILLE, TENN.

[Latitude, 36° 10′ N.; longitude, 86° 47′ W.]

Months and year.	Pressure.			Temperature.								Dew point.				Relative humidity.				Precipitation.	
	Mean.	Maximum.	Minimum.	7 a. m.	3 p. m.	10 p. m.	Mean.	Maximum.	Minimum.	Mean. Maximum.	Mean. Minimum.	7 a. m.	3 p. m.	10 p. m.	Mean.	7 a. m.	3 p. m.	10 p. m.	Mean.	Total.	Max. 24 hours.
	In.	In.	In.	°	°	°	°	°	°	°	°	°	°	°	°					In.	In.
J..	29.506	30.02	28.84	32.0	44.0	37.7	37.9	70	-2	47.5	27.6	24	28	28	27	74	57	71	67	5.13	2.06
F..	29.585	29.97	28.84	45.5	52.6	49.7	49.3	75	23	58.1	39.4	40	41	41	40	83	67	74	74	8.47	2.41
M.	29.464	29.73	29.13	42.1	56.2	49.2	49.2	77	24	59.4	40.2	35	36	37	36	78	52	67	65	3.36	1.37
A..	29.454	29.89	28.86	50.6	68.0	60.8	59.8	89	32	71.9	46.8	41	41	43	42	72	40	54	55	2.67	1.35
M.	29.404	29.63	29.12	62.7	79.7	69.6	70.7	89	50	81.9	59.3	59	58	60	59	88	50	74	70	3.43	0.99
J..	29.434	29.63	29.19	68.0	81.6	74.4	74.7	96	52	85.3	64.2	62	61	65	63	83	53	73	70	2.31	1.17
J..	29.425	29.60	29.25	74.0	87.7	80.3	80.7	98	66	90.8	71.3	70	68	70	69	86	54	72	70	3.77	1.65
A..	29.405	29.65	29.21	70.1	87.4	78.1	78.5	99	58	89.7	67.8	64	62	64	64	83	44	63	63	2.89	.93
S..	29.464	29.71	29.06	63.3	81.0	72.5	72.3	99	44	83.0	61.6	56	56	58	56	78	45	62	62	6.85	3.85
O..	29.518	29.73	29.25	48.5	65.6	57.8	57.3	86	27	67.7	46.3	43	45	46	45	81	56	67	66	1.92	1.00
N..	29.549	30.03	29.12	40.4	56.8	48.1	48.4	75	10	59.8	36.2	33	37	37	36	76	49	67	64	2.29	1.44
D..	29.526	30.07	28.96	34.1	42.7	38.7	38.5	59	6	46.0	31.2	30	32	33	32	84	69	82	78	5.31	2.58
Y..	29.478	30.07	28.84	52.6	66.9	59.7	59.7	99	-2	70.1	49.3	46	47	48	47	81	52	69	67	48.40	.....

NEW HAVEN, CONN.

[Latitude, 41° 18′ N.; longitude, 72° 56′ W.]

J..	29.909	30.53	29.24	22.3	28.9	24.4	25.2	51	-5	33.7	15.9	18	21	18	19	82	73	77	77	4.24	0.80
F..	30.092	30.83	29.09	26.4	33.0	30.1	29.8	53	8	37.7	22.3	20	22	22	21	76	67	74	72	6.22	2.43
M.	29.797	30.68	28.94	27.3	36.1	30.5	31.3	51	12	38.9	23.6	19	19	21	20	70	52	67	63	4.22	1.97
A..	29.864	30.58	29.04	39.4	50.4	43.4	44.4	80	23	53.8	35.5	29	30	32	30	66	50	65	60	2.75	0.91
M.	29.947	30.24	29.46	56.4	67.5	57.5	60.5	86	42	70.6	51.2	48	47	49	48	75	54	76	68	0.18	0.14
J..	29.908	30.22	29.53	62.6	70.9	63.6	65.5	90	44	74.4	56.1	55	57	57	56	78	64	80	74	5.62	2.70
J..	29.867	30.10	29.46	71.8	79.4	72.3	74.5	90	60	82.6	68.0	68	69	68	68	87	71	84	82	4.66	2.11
A..	29.873	30.20	29.63	64.2	73.5	65.8	67.8	86	50	76.4	60.5	59	60	61	60	84	65	85	78	4.80	1.36
S..	29.986	30.35	29.43	55.0	65.7	58.5	59.7	78	36	67.8	51.0	49	53	53	52	81	64	82	76	2.21	0.96
O..	29.901	30.38	29.37	46.5	57.1	49.8	51.1	75	25	59.5	43.0	40	42	42	41	78	60	75	71	3.24	1.59
N..	29.918	30.73	29.24	36.6	45.9	38.6	40.4	63	18	49.4	31.5	30	32	30	31	77	62	72	70	2.85	1.14
D..	29.969	30.83	29.00	29.0	36.9	31.8	32.6	56	8	39.6	25.4	24	29	26	26	84	73	79	79	3.09	0.81
Y..	29.918	30.83	28.94	44.8	53.8	47.1	48.6	90	-5	57.0	40.3	38	40	40	39	78	63	77	73	44.08	.....

NEW LONDON, CONN.

[Latitude, 41° 21′ N.; longitude, 72° 5′ W.]

J..	29.924	30.55	29.23	25.4	32.5	27.9	28.6	56	0	36.3	19.9	20	26	23	23	81	76	82	80	4.73	1.56
F..	30.141	30.88	29.15	28.3	34.6	31.7	31.5	54	10	39.3	24.5	22	27	26	25	79	74	80	78	5.88	1.40
M.	29.841	30.72	28.94	30.7	38.7	32.6	34.0	53	15	42.0	26.0	24	27	26	26	76	65	77	73	4.65	1.82
A..	29.913	30.62	29.10	41.5	49.8	43.6	45.0	79	24	53.8	36.7	34	35	36	35	75	60	74	70	3.63	1.11
M.	30.010	30.30	29.53	56.4	63.0	55.6	58.3	82	44	67.2	50.6	49	50	50	50	79	67	83	76	1.36	0.95
J.	29.967	30.26	29.57	63.2	68.1	61.5	64.3	84	47	71.8	55.9	57	57	57	57	81	71	86	79	4.69	1.99
J..	29.924	30.16	29.52	72.3	76.6	70.8	73.2	89	63	79.7	67.5	68	69	67	68	85	80	88	84	5.47	1.71
A..	29.914	30.25	29.60	66.9	73.7	67.0	69.2	84	52	75.8	61.9	61	62	62	62	83	70	84	79	4.19	1.32
S..	30.028	30.38	29.51	57.7	66.3	59.5	61.2	77	38	68.6	53.7	52	54	54	54	82	66	84	77	2.32	0.97
O..	29.943	30.41	29.38	49.9	57.8	51.7	53.1	73	30	60.4	45.4	44	45	46	45	82	65	80	76	4.28	1.94
N..	29.963	30.75	29.28	38.8	47.3	40.8	42.3	63	17	51.2	33.7	33	35	33	34	80	64	76	74	2.19	0.99
D..	30.007	30.87	28.96	31.8	39.0	34.2	35.0	57	9	41.7	27.8	26	28	28	27	82	66	78	75	4.62	1.35
Y..	29.965	30.88	28.94	46.9	54.0	48.1	49.7	89	0	57.3	42.0	41	43	42	42	80	69	81	77	48.01	.....

NEW ORLEANS, LA.

[Latitude, 29° 58′ N.; longitude, 90° 4′ W.]

J..	30.109	30.48	29.65	46.3	57.1	50.8	51.4	78	21	60.1	41.6	41	41	43	42	84	60	78	74	4.26	1.91
F..	30.128	30.51	29.76	62.3	69.3	64.1	65.2	82	44	73.7	59.0	59	58	59	58	90	70	85	81	5.58	2.49
M.	30.024	30.42	29.78	56.2	68.9	61.2	62.1	81	44	72.0	54.2	50	49	53	51	81	52	77	70	3.37	1.55
A..	30.022	30.26	29.66	61.7	75.5	66.4	67.9	87	48	77.2	60.1	57	54	60	57	85	49	80	71	1.87	1.28
M.	29.948	30.10	29.75	70.5	81.7	73.3	75.2	91	62	84.9	67.7	67	63	66	65	89	55	79	74	3.99	1.49
J..	29.918	30.04	29.76	75.4	82.6	76.8	78.3	91	66	86.2	72.5	71	69	71	70	88	67	84	79	11.33	5.48
J..	29.978	30.12	29.80	77.3	85.1	79.2	80.5	96	70	90.2	74.5	75	72	74	74	92	68	85	81	7.85	1.95
A..	29.910	30.03	29.69	77.0	86.4	79.5	81.0	94	71	89.7	75.0	74	73	74	74	89	66	85	80	7.42	2.06
S..	29.960	30.07	29.54	73.0	82.8	76.0	77.3	94	60	84.9	71.7	70	66	70	69	88	60	82	77	6.51	2.88
O..	29.976	30.21	29.21	64.1	73.0	67.1	68.1	86	42	76.0	62.0	58	57	60	58	83	61	79	74	4.71	3.19
N..	30.070	30.36	29.84	55.8	67.8	59.7	61.1	80	34	70.1	53.7	51	51	53	52	84	58	79	74	0.52	0.31
D..	30.023	30.54	29.63	49.7	56.1	53.0	52.9	77	29	59.7	46.3	45	47	48	47	86	74	83	81	7.56	2.00
Y..	30.006	30.54	29.21	64.1	73.9	67.3	68.4	96	21	77.1	61.5	60	58	61	60	86	62	81	76	64.97	.....

Monthly and yearly meteorological summaries—Continued.

NASHVILLE, TENN.

[$H = 549.$ $T = 92.$ $h = 79.$]

Cloudiness (in tenths).				Wind.													Number of days—										
7 a. m.	3 p. m.	10 p. m.	Mean.	Total (miles).	Maximum.	Direction.	Prevailing direction.	North.	Northeast.	East.	Southeast.	South.	Southwest.	West.	Northwest.	Calms.	Clear.	Fair.	Cloudy.	Foggy.	Rain or snow.	Max. below 32°.	Min. below 32°.	Max. above 90°.	Thunder-storms.	Auroras.	Months and year.
6.0	4.8	3.8	4.9	7,099	30	SW.	S.	8	4	2	19	22	10	10	18	0	9	15	7	0	10	6	17	0	2	0	J.
7.0	7.4	6.3	6.9	5,890	41	W.	S.	6	9	14	10	18	6	10	9	2	4	8	16	0	14	0	6	0	8	0	F.
5.0	5.5	2.7	4.7	5,568	31	SW.	NW.	8	9	9	8	6	12	13	26	2	13	9	9	0	11	0	6	0	4	0	M.
3.4	4.7	3.0	2.7	5,959	29	W.	SE., W	3	5	8	17	13	7	17	13	7	11	16	3	0	8	0	1	0	8	0	A.
4.1	6.4	3.3	4.6	3,516	27	W.	W.	9	6	6	10	10	8	18	13	13	10	15	6	0	11	0	0	0	13	0	M.
3.6	5.6	3.0	4.1	3,397	33	W.	W.	8	12	12	6	4	7	23	11	7	9	18	3	0	6	0	0	4	13	0	J.
4.9	6.3	4.2	5.1	3,195	27	W.	W.	7	10	7	11	3	19	20	9	6	9	12	9	0	12	0	0	18	24	0	J.
3.2	4.1	3.8	3.5	3,578	36	NE.	W.	9	15	4	4	9	8	21	19	4	15	13	3	0	7	0	0	17	6	0	A.
5.6	5.5	3.2	4.8	3,360	24	W.	E.	8	14	20	15	14	11	3	3	2	9	15	6	0	10	0	0	9	3	0	S.
4.2	4.4	3.3	4.0	4,715	30	SW.	NW.	12	12	5	11	12	2	12	21	6	14	10	7	0	6	0	2	0	0	0	O.
3.6	3.2	2.7	3.2	4,079	29	NW.	SE.	15	10	3	16	11	3	10	12	10	17	6	7	0	7	1	9	0	0	0	N.
6.8	7.1	6.2	6.7	4,897	31	W., NW	SE.	3	13	14	19	4	8	11	18	3	7	7	17	0	17	3	16	0	0	0	D.
4.8	5.4	3.8	4.7	54,353	..	.....	W.	96	119	104	146	126	101	168	172	62	127	144	93	0	119	10	57	48	81	0	Y.

NEW HAVEN, CONN.

[$H = 107.$ $T = 112.$ $h = 109.$]

5.8	6.4	5.9	6.0	6,746	62	W.	N.	22	13	3	1	5	19	14	15	1	4	15	12	0	13	12	28	0	0	0	J.
6.1	6.7	5.2	6.0	6,554	33	W.	NW., NE.	12	16	2	4	8	9	15	16	2	6	11	11	0	16	7	25	0	1	0	F.
5.2	6.1	4.6	5.3	8,089	34	NE.	NW.	23	10	0	8	7	3	12	28	2	7	17	7	0	9	4	28	0	0	0	M.
7.2	6.3	4.8	6.1	6,476	31	NE.	NW.	14	14	2	7	10	16	8	17	2	5	13	12	0	13	0	10	0	2	1	A.
4.4	4.4	3.1	4.0	4,382	20	N., NE.	S.	8	8	11	10	27	8	2	6	13	16	8	7	0	4	0	0	0	0	1	M.
6.1	6.5	4.3	5.6	4,234	19	NE.	S.	7	14	7	14	26	8	4	7	3	7	12	11	0	11	0	0	1	4	0	J.
7.1	6.3	5.7	6.4	4,409	18	N.W.	S.	6	2	2	10	31	21	5	12	4	3	13	15	0	13	0	0	1	5	0	J.
5.9	6.9	2.8	5.2	4,592	24	S.	N.	20	9	3	5	14	15	14	9	4	8	16	7	0	9	0	0	0	8	0	A.
4.4	5.7	5.1	5.1	4,805	25	N.	SW.	16	7	3	2	9	22	11	15	5	12	6	12	0	8	0	0	0	1	0	S.
4.9	6.8	5.5	5.7	5,321	25	W.	W.	17	12	3	2	13	13	18	11	4	7	15	9	0	9	0	4	0	1	0	O.
4.0	4.2	3.3	3.8	5,941	36	NE.	SW.	13	10	1	3	4	19	17	16	7	13	12	5	0	8	1	18	0	0	0	N.
5.5	6.1	6.1	5.9	6,460	42	NE.	N.	22	21	2	2	9	2	20	13	2	6	17	8	0	14	7	25	0	0	0	D.
5.6	6.0	4.7	5.4	68,000	..	.....	N.	180	136	39	68	163	155	140	165	49	94	155	116	0	127	31	138	2	22	2	Y.

NEW LONDON, CONN.

[$H = 47.$ $T = 29.$ $h = 58.$]

4.4	5.6	5.9	5.3	5,292	34	SW.	N.	21	6	7	0	4	12	15	17	11	7	16	8	0	14	11	27	0	0	0	J.
5.0	5.6	5.6	5.4	5,018	46	W.	NW.	9	10	5	3	5	6	8	23	15	7	15	6	0	16	5	22	0	1	0	F.
5.0	6.9	5.1	5.7	6,187	28	W.	N.	32	3	3	8	4	3	5	21	14	6	18	7	0	9	2	24	0	0	0	M.
5.6	5.1	4.2	5.0	4,302	26	S.	N.	16	7	4	4	11	7	8	9	24	9	13	8	0	12	0	10	0	0	0	A.
2.6	6.7	3.5	4.3	2,829	21	SE.	SE.	4	2	4	14	12	12	1	5	39	8	17	6	0	6	0	0	0	1	0	M.
4.1	4.5	4.2	4.2	3,354	25	E.	S.	3	9	7	9	12	9	8	3	30	10	16	4	0	10	0	0	0	2	0	J.
6.9	6.1	6.0	6.3	4,954	24	S., N.	SW.	3	2	1	17	19	20	9	11	11	3	18	10	0	12	0	0	0	4	0	J.
5.5	6.8	4.4	5.6	3,634	48	S.	N.	21	14	3	6	5	18	7	8	11	5	17	9	0	12	0	0	0	8	0	A.
5.5	6.1	4.8	5.5	3,709	26	SW.	SW.	10	13	3	5	1	18	10	11	19	8	11	11	0	8	0	0	0	2	0	S.
5.6	6.4	5.3	5.8	4,824	32	SW.	NW.	10	13	4	4	5	13	13	19	11	5	15	10	0	8	0	1	0	2	0	O.
5.3	5.8	4.5	5.2	5,325	32	SE.	NW.	13	10	1	5	4	14	12	21	10	8	14	8	0	7	0	12	0	0	0	N.
5.7	5.4	4.9	5.3	3,717	60	SE.	NW.	17	12	6	10	6	1	2	35	4	7	15	9	0	13	3	19	0	0	0	D.
5.1	5.9	4.9	5.3	55,145	..	.....	NW.	159	101	48	85	88	133	98	183	199	83	185	96	0	127	21	115	0	20	0	Y.

NEW ORLEANS, LA.

[$H = 52.$ $T = 87.$ $h = 77.$]

4.7	4.8	3.4	4.3	7,223	31	N.	N.	19	12	10	13	15	8	3	11	2	12	14	5	0	11	0	6	0	1	0	J.
5.9	7.1	3.6	5.5	5,861	32	N.	SE.	12	9	14	20	14	12	2	0	1	7	14	7	0	13	0	0	0	4	0	F.
3.3	3.5	3.0	3.3	5,656	23	N.	S.	14	11	14	14	15	13	2	8	2	15	12	4	0	7	0	0	0	4	0	M.
4.5	3.3	1.1	3.0	5,548	28	SW.	S.	14	7	12	18	21	8	3	5	2	15	14	1	0	6	0	0	0	3	0	A.
5.3	5.1	1.8	4.1	5,186	34	SE.	SW.	3	9	9	17	15	20	14	3	3	10	18	3	0	9	0	0	1	11	0	M.
4.0	6.1	2.8	4.3	4,864	26	NE.	SE.	7	13	24	27	10	2	3	0	4	12	11	7	0	11	0	0	5	9	0	J.
4.4	6.8	2.5	4.6	3,144	30	NW., N. E.	W.	7	5	4	4	9	20	25	6	13	6	21	4	0	18	0	0	17	19	0	J.
2.8	5.5	2.5	3.6	4,134	28	NW.	SE.	6	11	10	22	7	13	15	6	3	14	14	3	0	13	0	0	14	9	0	A.
3.3	4.5	2.2	3.3	5,657	38	NE.	E.	5	15	21	18	6	5	12	3	5	18	7	5	0	7	0	0	7	1	0	S.
3.9	5.4	3.9	4.4	7,372	42	N.	NE.	22	23	21	14	3	0	3	7	0	14	9	8	0	7	0	0	0	0	0	O.
3.6	3.8	2.4	3.3	4,873	24	NE., NW., N.	N.	19	15	15	14	3	6	6	8	4	17	7	6	1	5	0	0	0	0	0	N.
6.6	8.1	5.5	6.7	6,625	33	S.	N. E.	16	20	14	11	7	3	12	8	2	5	11	15	0	15	0	2	0	0	0	D.
4.4	5.3	2.9	4.2	66,143	..	.....	S. E.	144	150	168	192	125	110	100	65	41	145	152	68	1	122	0	8	44	61	0	Y.

Monthly and yearly meteorological summaries—Continued.

NEW YORK CITY.

[Latitude, 40° 42′ N.; longitude, 74° 0′ W.]

Months and year.	Pressure. Mean.	Pressure. Maximum.	Pressure. Minimum.	Temperature. 7 a. m.	Temperature. 3 p. m.	Temperature. 10 p. m.	Temperature. Mean.	Temperature. Maximum.	Temperature. Minimum.	Temperature. Mean. Maximum.	Temperature. Mean. Minimum.	Dew point. 7 a. m.	Dew point. 3 p. m.	Dew point. 10 p. m.	Dew point. Mean.	Relative humidity. 7 a. m.	Relative humidity. 3 p. m.	Relative humidity. 10 p. m.	Relative humidity. Mean.	Precipitation. Total.	Precipitation. Max. 24 hours.
	In.	In.	In.	°	°	°	°	°	°	°	°	°	°	°	°					In.	In.
J ..	29.848	30.45	29.22	27.5	33.5	29.4	30.1	63	6	37.5	22.8	20	23	20	21	74	68	70	71	4.19	.89
F ..	30.006	30.74	29.06	31.1	36.5	33.5	33.7	63	17	40.5	27.3	22	24	25	24	70	62	72	68	5.26	1.64
M .	29.727	30.57	29.00	31.3	38.3	33.2	34.3	50	16	41.7	27.3	21	21	22	22	66	52	65	61	3.51	1.41
A ..	29.790	30.48	28.99	43.4	53.0	46.8	47.7	80	26	56.7	39.2	30	32	32	31	61	48	59	56	3.67	1.67
M .	29.856	30.13	29.38	58.8	69.4	50.4	62.9	88	47	72.6	55.2	47	50	50	49	68	53	70	64	.99	.50
J ..	29.826	30.14	29.46	65.1	73.8	65.7	68.2	90	51	77.5	60.3	56	57	58	57	75	58	76	70	7.70	3.13
J ..	29.792	30.02	29.44	73.8	81.7	74.5	76.7	94	66	85.3	70.4	67	67	67	67	80	63	79	74	6.75	2.40
A ..	29.797	30.10	29.47	67.9	76.2	70.2	71.4	88	55	78.9	65.2	60	60	61	60	76	59	72	69	3.66	1.42
S ..	29.917	30.27	29.36	59.1	68.1	62.0	63.1	84	41	69.9	56.3	51	51	54	52	75	58	75	69	2.30	.98
O ..	29.832	30.29	29.31	50.5	59.9	53.6	54.7	78	32	63.1	47.9	42	42	43	42	73	52	67	65	2.36	1.83
N ..	29.851	30.57	29.31	39.9	48.7	42.5	43.7	67	23	53.9	37.2	30	31	30	30	68	54	62	61	2.04	.69
D ..	29.899	30.72	29.06	33.0	39.5	35.7	36.1	56	12	42.5	29.4	26	28	26	27	77	66	70	71	4.20	1.03
Y ..	29.845	30.74	28.99	48.4	56.6	50.6	51.9	94	6	60.0	44.9	39	40	41	40	72	58	70	67	46.63	.....

NORFOLK, VA.

[Latitude, 36° 51′ N.; longitude, 76° 17′ W.]

Months and year.	Pressure. Mean.	Pressure. Maximum.	Pressure. Minimum.	Temperature. 7 a. m.	Temperature. 3 p. m.	Temperature. 10 p. m.	Temperature. Mean.	Temperature. Maximum.	Temperature. Minimum.	Temperature. Mean. Maximum.	Temperature. Mean. Minimum.	Dew point. 7 a. m.	Dew point. 3 p. m.	Dew point. 10 p. m.	Dew point. Mean.	Relative humidity. 7 a. m.	Relative humidity. 3 p. m.	Relative humidity. 10 p. m.	Relative humidity. Mean.	Precipitation. Total.	Precipitation. Max. 24 hours.
J ..	30.078	30.60	29.48	35.1	44.8	38.2	39.4	69	13	48.3	30.1	30	33	31	31	82	67	77	76	5.64	1.68
F .	30.207	30.81	29.49	42.9	50.6	46.5	46.7	75	27	57.7	39.4	37	39	40	39	83	69	80	77	2.61	.72
M .	29.951	30.61	29.46	39.4	49.3	43.3	44.1	76	25	53.9	35.9	33	34	34	34	80	59	70	70	4.38	1.88
A ..	30.011	30.60	29.37	48.7	59.8	50.6	53.0	84	32	63.5	43.7	41	40	42	41	77	52	75	68	3.37	.86
M .	30.009	30.34	29.65	64.0	74.7	65.0	67.9	92	50	77.6	59.8	59	58	57	58	83	59	77	73	1.94	.63
J .	29.991	30.29	29.63	69.4	80.0	69.8	73.1	96	56	81.6	64.7	64	62	64	64	86	56	83	75	2.72	1.12
J ..	29.971	30.22	29.72	77.0	87.0	78.1	80.7	102	65	89.9	73.0	74	72	72	73	90	64	82	79	5.33	1.14
A ..	29.954	30.20	29.65	72.1	79.5	73.8	75.1	92	60	82.6	68.5	68	69	69	69	88	72	84	81	8.56	2.29
S ..	30.087	30.36	29.70	64.9	75.2	67.7	69.3	91	46	77.6	61.3	61	61	63	62	89	63	83	78	3.06	2.00
O ..	30.012	30.38	29.50	56.0	65.8	59.5	60.4	87	40	68.5	52.9	52	56	54	54	88	72	83	81	6.38	1.34
N ..	30.100	30.62	29.57	43.9	55.2	48.2	49.1	74	30	58.6	40.2	40	44	41	42	88	67	78	78	1.69	.76
D ..	30.110	30.74	29.24	38.7	46.8	42.0	42.5	64	19	50.1	35.6	36	38	36	39	90	73	82	82	4.06	1.18
Y ..	30.040	30.81	29.24	54.3	64.1	56.9	58.4	102	13	67.5	50.4	50	50	50	50	85	64	79	76	47.74	.....

NORTHFIELD, VT.

[Latitude, 44° 10′ N.; longitude, 72° 41′ W.]

Months and year.	Pressure. Mean.	Pressure. Maximum.	Pressure. Minimum.	Temperature. 7 a. m.	Temperature. 3 p. m.	Temperature. 10 p. m.	Temperature. Mean.	Temperature. Maximum.	Temperature. Minimum.	Temperature. Mean. Maximum.	Temperature. Mean. Minimum.	Dew point. 7 a. m.	Dew point. 3 p. m.	Dew point. 10 p. m.	Dew point. Mean.	Relative humidity. 7 a. m.	Relative humidity. 3 p. m.	Relative humidity. 10 p. m.	Relative humidity. Mean.	Precipitation. Total.	Precipitation. Max. 24 hours.
J ..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
F ..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
M .	28.934	29.79	28.33	15.9	26.8	20.6	21.1	45	-15	31.0	11.9	10	16	14	13	78	64	77	73	4.68	1.32
A ..	29.008	29.66	28.22	29.8	43.0	33.5	35.4	68	-1	46.0	24.1	22	28	26	25	74	57	75	68	3.37	1.09
M .	29.099	29.38	28.63	53.0	68.9	54.7	58.9	84	29	71.2	45.2	47	48	49	48	79	52	83	71	1.39	.46
J ..	29.068	29.42	28.75	59.2	70.6	59.1	63.0	88	40	73.1	51.0	54	57	56	56	84	64	90	80	4.12	1.06
J ..	29.028	29.22	28.64	66.9	77.6	66.6	70.4	91	54	80.1	60.8	63	65	63	64	86	67	90	81	5.33	1.40
A ..	29.043	29.41	28.70	56.2	70.1	56.8	61.0	83	37	71.6	49.2	54	58	54	55	91	66	92	83	4.53	1.15
S ..	29.130	29.49	28.47	46.6	61.7	49.4	52.6	79	29	63.6	39.9	43	50	45	46	90	68	86	81	1.78	.63
O ..	29.028	29.56	28.48	38.6	49.9	41.7	43.4	70	19	52.2	34.0	35	41	37	38	87	74	83	82	1.47	.70
N ..	29.022	29.89	28.30	29.6	36.4	31.3	32.4	62	1	40.5	23.0	25	28	25	26	85	74	81	80	3.82	1.06
D ..	29.088	29.98	28.29	18.0	24.5	20.0	20.8	43	-21	27.5	12.6	15	18	16	16	88	77	86	84	5.88	2.14
Y ..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

NORTH PLATTE, NEBR.

[Latitude, 41° 9′ N.; longitude, 100° 45′ W.]

Months and year.	Pressure. Mean.	Pressure. Maximum.	Pressure. Minimum.	Temperature. 7 a. m.	Temperature. 3 p. m.	Temperature. 10 p. m.	Temperature. Mean.	Temperature. Maximum.	Temperature. Minimum.	Temperature. Mean. Maximum.	Temperature. Mean. Minimum.	Dew point. 7 a. m.	Dew point. 3 p. m.	Dew point. 10 p. m.	Dew point. Mean.	Relative humidity. 7 a. m.	Relative humidity. 3 p. m.	Relative humidity. 10 p. m.	Relative humidity. Mean.	Precipitation. Total.	Precipitation. Max. 24 hours.
J ..	26.971	27.50	26.38	11.5	25.9	19.2	18.9	56	-21	31.1	8.2	7	18	14	13	82	72	80	78	.15	.11
F ..	27.074	27.50	26.16	10.2	27.4	20.2	19.3	59	-16	32.1	8.4	6	17	15	13	83	69	79	77	.49	.19
M .	27.126	27.60	26.73	28.4	48.5	38.7	38.5	78	10	53.8	27.4	24	31	30	28	82	54	72	70	.22	.12
A ..	26.965	27.38	26.43	39.3	59.8	50.6	49.9	93	18	64.0	37.8	35	36	38	36	84	47	67	66	3.41	.87
M .	27.036	27.46	26.49	50.7	72.2	62.7	61.9	93	31	77.0	48.9	45	47	47	46	81	44	60	62	.81	.30
J ..	27.028	27.33	26.82	61.7	78.7	70.9	70.4	94	46	81.9	59.7	57	59	61	59	86	52	72	70	2.20	1.14
J ..	27.101	27.31	26.92	63.6	83.8	74.6	74.0	99	54	87.7	62.2	58	62	64	62	83	50	71	68	3.05	.96
A ..	27.062	27.32	26.81	60.7	79.3	69.5	69.8	100	47	82.4	59.2	57	60	61	60	88	56	76	73	4.61	1.47
S ..	27.139	27.48	26.80	54.2	72.3	62.2	62.9	94	30	75.4	52.9	50	56	54	54	87	59	76	74	5.10	2.46
O ..	27.147	27.55	26.50	35.3	59.2	46.7	47.1	85	9	61.5	33.2	30	43	40	38	83	58	77	73	.15	.12
N ..	27.126	27.41	26.62	24.9	48.7	35.0	36.2	81	-25	52.3	21.9	19	32	28	26	80	58	75	71	.19	.12
D ..	27.055	27.46	26.48	15.9	30.8	20.9	22.5	56	-18	34.2	11.5	11	20	15	16	80	67	78	75	.30	.12
Y ..	27.069	27.60	26.16	38.0	57.2	47.6	47.6	100	-25	61.1	35.9	33	40	39	38	83	57	74	71	21.68	.....

Monthly and yearly meteorological summaries—Continued.

NEW YORK CITY.

[H=185. T=148. h=145.]

Cloudiness (in tenths).				Wind												Number of days—											
7 a. m.	3 p. m.	10 p. m.	Mean.	Total (miles).	Maximum.	Direction.	Prevailing direction.	North.	Northeast.	East.	Southeast.	South.	Southwest.	West.	Northwest.	Calms.	Clear.	Fair.	Cloudy.	Foggy.	Rain or snow.	Max. below 32°.	Min. below 32°.	Max. above 90°.	Thunder-storms.	Auroras.	Months and year.
5.4	6.4	4.5	5.4	6,978	32	NW.	NW.	14	14	3	7	16	8	13	18	0	8	12	11	0	11	10	23	0	0	0	J.
6.1	6.4	5.0	5.8	7,190	46	NW.	NW.	10	14	7	9	5	7	15	17	0	7	9	12	0	16	4	20	0	1	0	F.
5.2	5.9	3.8	5.0	8,177	34	NW.	NW.	16	10	7	7	4	4	5	39	1	7	15	9	0	10	1	24	0	0	0	M.
5.4	5.9	3.9	5.1	6,607	29	NW.	NW.	9	13	6	8	11	13	7	22	1	6	17	7	0	12	0	6	0	1	0	A.
4.4	4.4	2.6	3.8	3,865	16	N., S.	SE.	4	17	6	21	18	8	4	11	4	15	11	5	0	5	0	0	0	2	0	M.
4.5	5.6	3.7	4.6	4,541	24	SE.	SE.	12	7	8	25	11	6	9	3	9	9	15	6	0	11	0	0	1	4	0	J.
6.4	5.6	4.5	5.5	4,472	36	W.	S.	4	4	2	15	32	14	10	7	5	8	13	10	0	17	0	0	5	11	0	J.
4.6	5.6	4.3	4.8	5,415	33	W.	N.	21	6	4	8	17	10	12	13	2	10	15	6	0	7	0	0	0	4	0	A.
3.3	5.3	4.9	4.5	5,271	30	SW.	NW.	16	5	5	5	8	12	16	19	4	13	8	9	1	11	0	0	0	0	0	S.
5.0	6.0	5.5	5.5	5,749	26	NW.	W., NW	10	9	3	6	8	9	23	23	2	8	13	10	0	9	0	0	0	0	0	O.
4.6	4.4	4.5	4.5	7,091	48	W.	W., NW	10	5	3	2	9	14	19	19	9	9	14	7	0	7	0	5	0	0	0	N.
6.4	6.1	5.3	5.9	7,546	50	W.	NW.	9	13	3	5	7	3	17	21	15	7	12	12	0	14	3	18	0	0	0	D.
5.1	5.6	4.4	5.0	72,362	..	.....	NW.	135	117	57	118	146	108	150	212	52	107	154	104	1	130	18	96	6	23	0	Y.

NORFOLK, VA.

[H=30. T=58. h=50.]

5.3	6.3	4.6	5.4	5,727	29	SW.	SW.	19	6	1	5	17	20	7	10	8	7	15	9	0	11	5	18	0	0	0	J.
7.8	7.6	5.6	7.0	5,123	36	SW.	NE.	12	23	2	6	5	15	9	6	6	2	13	13	0	13	0	3	0	0	0	F.
6.2	5.4	4.8	5.5	6,414	27	N.	N.	26	15	12	2	5	10	6	16	1	9	10	12	0	14	0	4	0	1	0	M.
5.4	6.2	3.7	5.1	5,439	32	SW.	E.	15	14	16	6	5	13	5	11	5	10	11	9	0	12	0	2	0	4	0	A.
5.3	4.7	3.2	4.4	4,106	19	S.	NE.	10	24	17	14	12	9	0	2	5	11	13	7	0	8	0	0	1	3	0	M.
4.6	4.3	4.2	4.4	5,255	27	NE.	NE.	9	27	13	9	3	15	4	6	4	11	14	5	0	9	0	0	4	5	0	J.
4.9	5.9	4.1	5.0	4,892	20	S.	S.	3	4	17	13	32	13	4	4	3	10	13	8	0	13	0	0	14	6	0	J.
5.6	6.1	4.4	5.4	4,786	34	NE.	N.	24	21	6	12	11	12	3	4	0	9	14	8	0	19	0	0	2	5	0	A.
4.3	5.6	3.5	4.5	4,687	24	N.	NE.	14	27	14	12	8	12	0	3	0	8	16	6	0	7	0	0	2	2	0	S.
5.0	5.3	4.4	4.9	5,809	40	NE.	NE	20	21	6	1	5	13	13	11	0	14	5	12	0	16	0	0	0	0	0	O.
3.7	4.6	1.8	3.4	5,296	38	N.	N.	19	15	0	5	13	17	5	16	0	13	15	2	0	8	0	3	0	0	0	N.
5.6	5.2	5.4	5.4	5,242	30	NW.	N.	20	12	6	18	9	5	10	11	2	8	13	10	0	23	1	6	0	0	0	D.
5.3	5.6	4.1	5.0	62,776	..	.....	NE.	191	200	119	103	125	157	66	100	34	112	152	101	0	143	6	36	23	26	0	Y.

NORTHFIELD, VT.

[H=871. T=16. h=2.]

..	..	..	..	.....	..	.....	....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	J.
..	..	..	..	.....	..	.....	....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	F.
7.5	5.6	5.4	6.2	9,684	39	N.	N.	28	12	1	6	22	6	4	14	0	5	13	13	0	18	15	31	0	0	0	M.
4.7	5.0	3.9	4.5	6,253	46	N.	S.	25	5	3	2	36	8	3	6	2	11	11	8	0	13	2	22	0	0	2	A.
3.5	3.5	2.3	3.1	6,161	30	N.	S.	21	11	2	3	41	8	2	5	0	19	6	6	0	8	0	2	0	3	5	M.
4.6	5.3	3.2	4.4	5,107	27	E.	S.	11	13	7	0	49	12	2	5	0	13	10	7	0	10	0	0	0	1	2	J.
4.1	5.8	4.2	4.7	5,438	36	N.	S.	15	12	1	4	38	16	4	3	0	11	12	8	0	18	0	0	1	3	2	J.
3.6	5.0	2.0	3.5	5,063	30	N.	S.	22	12	0	3	38	10	2	5	1	17	10	4	0	13	0	0	0	0	2	A.
4.7	4.4	4.6	4.6	5,473	30	S.	S.	13	4	1	0	42	10	2	14	4	11	12	7	0	11	0	6	0	1	1	S.
6.7	6.5	5.8	6.3	6,108	45	SW.	S.	12	9	1	5	36	16	4	7	3	4	14	13	0	16	0	12	0	0	0	O.
7.3	5.6	5.9	6.3	6,621	40	NE., NW.	S.	20	11	3	4	23	19	3	6	1	5	11	14	0	12	3	27	0	0	1	N.
6.9	6.9	5.7	6.5	5,971	40	NW.	N.	25	19	3	0	22	15	3	5	1	5	15	11	0	15	18	28	0	0	2	D.
..	..	..	..	.....	..	.....	....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	Y.

NORTH PLATTE, NEBR.

[H=2841. T=45. h=34.]

2.3	4.5	2.6	3.1	5,803	40	W.	W.	7	4	6	4	9	11	33	18	1	15	16	0	0	4	11	29	0	0	0	J.
3.8	4.0	3.9	3.9	6,507	52	NW.	SE.	12	3	10	17	11	5	8	16	2	14	8	6	0	6	13	28	0	0	0	F.
3.6	4.7	3.3	3.9	7,275	44	NW.	NW.	7	8	11	13	7	9	14	24	0	11	17	3	0	6	2	20	0	0	0	M.
4.4	5.6	3.0	4.3	9,290	52	S.	NW.	8	5	8	13	16	2	15	23	0	12	13	5	0	9	0	11	1	1	0	A.
3.3	4.1	2.5	3.3	8,345	44	NW.	SE.	11	1	13	22	11	5	10	17	3	16	10	5	0	5	0	1	2	4	0	M
4.1	4.3	4.3	4.2	8,153	36	N., SE.	SE.	10	4	15	40	7	1	5	7	1	9	18	3	0	7	0	0	5	5	0	J.
2.5	3.6	3.8	3.3	7,103	48	E.	SE.	12	10	11	23	11	7	5	14	0	12	19	0	0	7	0	0	13	6	0	J.
4.2	4.3	4.2	4.2	6,864	54	E.	SE.	7	5	16	35	16	0	6	8	0	12	15	4	0	10	0	0	7	4	0	A
4.6	3.7	2.8	3.7	6,785	34	N.	SE.	10	12	12	25	16	1	10	4	0	12	14	4	0	9	0	1	3	3	0	S.
3.8	4.1	3.0	3.6	6,879	36	NW.	NW.	18	3	5	14	11	5	16	21	0	16	9	6	0	3	1	13	0	0	0	O.
3.2	4.2	2.3	3.2	5,452	36	NW.	NW.	8	4	9	5	3	12	22	27	0	14	12	4	0	4	8	20	0	0	0	N.
2.9	4.7	3.3	4.0	6,615	37	N.	NW.	7	1	4	10	8	7	27	28	1	14	10	7	0	7	8	30	0	0	0	D.
3.6	4.3	3.2	3.7	85,071	..	.....	SE.	117	60	120	221	126	65	171	207	8	157	161	47	0	77	43	153	31	23	0	Y.

Monthly and yearly meteorological summaries—Continued.

OLYMPIA, WASH.

[Latitude, 47° 3′ N.; longitude, 122° 53′ W.]

Months and year.	Pressure. Mean.	Pressure. Maximum.	Pressure. Minimum.	Temperature. 7 a. m.	Temperature. 3 p. m.	Temperature. 10 p. m.	Temperature. Mean.	Temperature. Maximum.	Temperature. Minimum.	Temperature. Mean. Maximum.	Temperature. Mean. Minimum.	Dew point. 7 a. m.	Dew point. 3 p. m.	Dew point. 10 p. m.	Dew point. Mean.	Relative humidity. 7 a. m.	Relative humidity. 3 p. m.	Relative humidity. 10 p. m.	Relative humidity. Mean.	Precipitation. Total.	Precipitation. Max. 24 hours.
	In.	In.	In.	°	°	°	°	°	°	°	°	°	°	°	°					In.	In.
J ..	29.951	30.42	29.30	39.1	41.7	41.2	40.7	54	26	45.6	36.4	37	39	39	38	94	90	92	92	9.83	1.04
F ..	29.917	30.38	29.39	27.4	34.6	32.7	31.6	54	2	38.2	24.0	25	29	28	28	89	81	84	85	4.28	1.08
M .	30.057	30.54	29.54	40.7	48.7	46.6	45.3	63	25	52.6	38.2	38	42	42	41	92	79	85	86	10.60	1.28
A ..	30.030	30.44	29.51	40.6	51.7	49.4	47.2	67	27	55.7	38.5	38	42	42	41	92	70	76	79	3.94	1.25
M .	29.997	30.33	29.50	45.7	59.9	59.5	55.0	89	32	65.9	43.8	43	48	48	47	93	68	69	76	5.66	1.24
J ..	30.010	30.29	29.67	46.6	62.2	63.2	57.3	93	36	68.5	45.2	45	51	51	49	94	68	66	76	1.01	.33
J .	30.067	30.26	29.82	49.5	66.4	69.2	61.7	86	40	74.6	48.1	48	56	57	53	94	69	66	76	.74	.59
A ..	29.973	30.26	29.80	51.3	65.6	66.5	61.1	85	40	72.2	49.0	50	55	56	54	94	70	69	78	.18	.13
S ..	29.998	30.25	29.69	47.7	61.5	58.7	56.0	83	34	67.5	45.3	46	52	52	50	93	71	80	82	3.34	2.26
O ..	30.139	30.45	29.61	44.3	53.0	50.5	49.3	66	30	57.4	42.0	43	48	47	46	96	83	88	89	1.51	.34
N ..	30.048	30.51	29.56	40.2	46.4	43.6	43.4	61	20	48.8	37.4	39	41	40	40	95	83	88	89	4.94	1.18
D ..	29.955	30.63	29.16	38.9	43.1	41.9	41.3	56	30	45.5	36.8	37	40	39	39	94	89	90	91	15.75	3.85
Y ..	30.012	30.63	29.26	42.7	52.9	51.9	49.2	93	2	57.7	40.4	40	45	45	44	93	77	80	83	61.78	.....

OMAHA, NEBR.

[Latitude, 41° 16′ N.; longitude, 95° 56′ W.]

J ..	28.835	29.52	28.17	6.7	15.7	13.1	11.8	51	-22	23.9	-0.4	-1	6	5	3	68	67	69	68	.49	.36
F ..	28.967	29.62	27.85	12.9	22.4	19.3	18.2	59	-16	29.6	8.9	9	16	15	13	83	78	84	82	1.00	.32
M .	28.935	29.43	28.48	31.1	44.7	38.2	38.0	78	10	50.5	29.0	25	31	29	28	78	60	72	70	.48	.40
A ..	28.754	29.16	28.29	45.8	62.1	55.6	54.5	88	23	67.1	44.3	38	39	42	40	76	46	62	61	.88	.24
M .	28.802	29.16	28.10	56.8	75.2	66.2	66.1	93	39	78.2	55.4	48	47	50	48	74	39	58	57	1.39	.79
J ..	28.803	29.05	28.63	65.2	79.4	72.7	72.4	94	49	82.1	63.6	59	60	62	60	81	54	70	68	4.56	1.01
J ..	28.835	28.99	28.67	68.6	84.4	76.0	76.3	103	55	87.2	66.6	62	60	64	62	81	46	67	64	2.02	.99
A ..	28.844	29.03	28.64	64.4	79.3	72.4	72.0	102	48	82.3	63.0	58	59	60	59	82	53	68	68	3.94	1.50
S ..	28.909	29.24	28.44	58.6	72.5	64.9	65.3	92	39	75.7	56.4	53	53	55	54	82	53	71	69	2.44	1.02
O ..	28.923	29.40	28.39	42.8	58.0	51.4	50.7	81	16	63.6	39.5	34	34	36	35	72	44	57	58	.72	.69
N ..	28.917	29.30	28.42	32.9	46.2	39.8	39.6	80	-14	52.8	27.9	23	24	24	24	70	47	56	58	.89	.66
D ..	28.880	29.48	28.18	20.2	27.7	22.9	23.6	48	-14	33.2	15.5	14	17	15	15	79	66	72	72	1.11	.47
Y ..	28.866	29.62	27.85	42.2	55.6	49.4	49.1	103	-22	60.5	39.1	35	37	38	37	77	54	67	66	19.92	.....

OSWEGO, N. Y.

[Latitude, 43° 29′ N.; longitude 76° 35′ W.]

J ..	29.594	30.22	28.96	17.8	22.1	21.0	20.3	50	-10	29.4	10.4	14	16	16	15	85	78	83	82	.92	.29
F ..	29.781	30.54	28.87	21.5	25.2	24.3	23.7	47	2	31.2	15.7	17	19	19	18	82	78	81	80	3.48	.92
M .	28.609	30.41	28.96	23.6	28.3	27.2	26.4	48	6	33.1	18.9	17	18	20	18	77	68	75	73	1.21	.60
A ..	29.613	30.26	28.76	37.6	44.4	39.6	40.5	66	16	48.9	32.1	27	29	30	29	67	58	70	65	1.58	.50
M .	29.660	30.01	29.27	56.2	63.2	58.4	59.3	87	43	68.5	49.9	48	50	48	49	76	63	70	70	1.03	.59
J ..	29.630	30.02	29.31	60.7	65.4	60.9	62.3	82	45	70.2	54.3	56	57	56	56	85	75	85	82	2.72	.98
J ..	29.585	29.78	29.25	70.0	76.2	71.1	72.4	90	58	80.8	65.9	63	67	66	65	80	76	83	80	1.82	.69
A ..	29.617	29.95	29.27	62.1	70.4	66.4	66.3	87	48	73.5	58.8	56	57	56	56	81	65	71	72	1.69	1.06
S ..	29.719	30.10	29.13	53.8	63.2	57.6	58.2	79	40	66.4	50.6	46	48	49	48	76	60	74	70	1.91	.50
O ..	29.627	30.13	29.07	44.1	49.6	46.6	46.8	72	24	55.7	40.9	38	39	39	38	79	68	76	74	2.39	.44
N ..	29.644	30.62	28.99	36.4	40.0	36.0	37.5	70	9	44.7	30.9	28	28	28	28	75	67	76	72	2.38	.56
D ..	29.701	30.63	29.10	26.4	29.9	29.0	28.4	52	0	34.5	22.9	22	24	25	24	85	81	87	84	2.28	72
Y ..	29.648	30.63	28.76	42.5	48.2	44.8	45.2	90	-10	53.1	37.6	36	38	38	37	79	70	78	75	23.41	.....

PALESTINE, TEX.

[Latitude, 31° 45′ N.; longitude, 95° 40′ W.]

J ..	29.581	30.02	29.13	38.5	52.4	46.9	45.9	78	11	57.2	35.7	34	37	38	36	83	59	73	72	.52	.29
F ..	29.590	30.00	29.15	51.1	58.8	54.1	54.7	81	23	65.7	45.9	46	44	46	45	83	62	76	74	3.87	1.51
M	29.524	29.85	29.24	53.5	68.4	62.6	61.5	85	34	72.9	51.2	48	48	50	49	82	51	65	66	1.45	1.27
A ..	29.486	29.77	29.04	57.9	73.6	66.4	66.0	88	40	77.0	55.4	53	52	55	53	84	49	68	67	.74	.49
M	29.444	29.61	29.16	65.3	79.6	71.5	72.1	92	46	83.5	62.8	61	63	63	62	87	58	75	73	6.76	3.84
J ..	29.419	29.56	29.19	70.3	85.0	76.0	77.1	95	61	88.7	68.5	66	67	67	67	88	56	76	73	2.57	1.10
J ..	29.482	29.65	29.35	73.9	91.0	81.0	82.0	102	66	94.6	72.1	71	70	72	71	90	51	74	72	2.97	1.28
A ..	29.428	29.54	29.30	73.5	89.5	79.7	80.9	100	62	93.0	72.1	70	69	70	69	89	53	72	71	5.18	2.45
S ..	29.479	29.59	29.25	68.4	82.8	74.5	75.2	92	50	85.4	66.3	64	65	65	65	88	57	74	73	2.20	1.78
O ..	29.544	29.84	29.26	56.4	71.7	63.6	63.9	87	39	74.8	53.9	52	53	53	53	88	53	70	70	3.20	2.66
N	29.592	30.01	29.38	48.8	64.4	56.3	56.5	80	20	68.1	45.7	42	45	46	44	79	52	70	67	1.86	.74
D ..	29.554	30.04	29.10	41.4	49.6	45.7	45.6	79	11	54.1	38.4	38	40	40	39	89	71	83	81	6.72	1.99
Y ..	29.511	30.04	29.04	58.2	72.2	64.9	65.1	102	11	76.2	55.7	54	54	55	54	86	56	73	72	38.04	.....

Monthly and yearly meteorological summaries—Continued.

OLYMPIA, WASH.

[H=36. T=46. h=41.]

Cloudiness (in tenths).				Wind.													Number of days—											
7 a. m.	3 p. m.	10 p. m.	Mean.	Total (miles).	Maximum.	Direction.	Prevailing direction.	North.	Northeast.	East.	Southeast.	South.	Southwest.	West.	Northwest	Calms.	Clear.	Fair.	Cloudy.	Foggy.	Rain or snow.	Max. below 32°.	Min. below 32°.	Max. above 90°.	Thunder-storms.	Auroras.	Months and year.
8.1	8.4	7.2	7.9	4,939	26	W.	S.	1	1	2	0	56	24	6	1	2	1	10	20	0	28	0	6	0	0	0	J.
6.2	6.3	5.5	6.0	3,757	22	S.	S.	9	20	0	3	32	11	3	5	1	5	11	12	0	20	5	23	0	0	0	F.
6.2	7.0	6.0	6.4	3,587	20	SW.	S.	17	6	1	0	33	19	6	3	8	8	6	17	0	20	0	5	0	0	0	M.
6.3	6.5	5.6	6.1	3,449	24	SW.	SW.	13	1	2	1	18	23	20	4	8	5	12	13	0	18	0	6	0	0	0	A.
6.5	5.4	4.6	6.5	3,489	24	S.	S.	22	9	0	0	24	12	13	3	10	9	10	12	0	11	0	1	0	0	0	M.
4.7	5.0	1.8	3.8	2,084	14	SW.	N.	35	5	0	0	10	11	10	3	19	12	16	3	0	2	0	0	0	1	0	A.
4.2	5.4	3.4	4.3	1,810	17	W.	N.	19	7	0	1	16	11	6	3	27	11	14	5	0	7	0	0	0	0	0	S.
4.5	7.5	4.2	5.4	1,913	16	W., S.	N.	20	3	0	1	15	12	5	5	32	9	13	9	0	10	0	1	0	0	0	O.
6.8	7.6	6.0	6.8	2,269	24	S.	S.	6	10	0	0	29	7	0	5	33	5	11	14	0	16	0	11	0	0	0	N.
8.1	9.2	7.4	8.2	3,405	20	S.	S.	4	4	2	1	43	15	1	2	21	1	10	20	0	22	0	4	0	0	0	D.
5.9	6.5	4.8	5.7	33,794	..	.....	S.	194	73	8	8	288	161	92	39	232	90	134	141	0	165	5	57	1	1	0	Y.

OMAHA, NEBR.

[H=1,113. T=88. h=82.]

3.4	5.1	4.3	4.3	6,049	32	NW.	NW.	18	3	4	6	17	4	8	24	9	11	14	6	0	7	17	31	0	0	0	J.
4.6	5.3	4.6	4.8	5,406	36	NW.	N.	20	5	3	11	14	1	2	16	12	12	7	9	0	10	13	28	0	0	0	F.
5.3	5.4	3.7	4.8	5,533	40	NW.	N.	27	6	1	13	16	5	3	15	7	9	16	6	0	5	1	19	0	0	0	M.
6.3	6.1	3.8	5.4	7,376	36	S., N.	NW.	7	1	2	19	19	6	2	24	10	7	15	8	0	8	0	3	0	1	0	A.
3.7	4.5	3.2	3.8	7,384	34	NW.	S.	20	4	0	18	22	6	5	15	3	16	8	7	0	6	0	0	3	4	0	M.
5.8	6.3	4.3	5.5	5,822	30	N.	SE.	8	5	1	33	27	0	0	14	2	7	13	10	0	11	0	0	1	9	0	J.
3.9	4.0	2.8	3.6	5,065	25	SW.	N.	34	1	1	18	17	6	2	7	7	13	15	3	0	7	0	0	10	5	0	J.
5.3	5.2	3.6	4.7	5,477	34	N.	S.	19	7	3	14	31	2	0	9	8	11	11	9	0	11	0	0	8	6	0	A.
6.4	5.5	4.3	5.4	5,848	36	S.	S.	22	7	1	15	28	6	2	6	3	8	15	7	0	8	0	0	2	3	0	S.
3.5	4.2	3.4	3.7	6,443	30	N., S., W., NW.	NW.	17	1	1	12	19	4	9	20	10	15	10	6	0	3	0	5	0	0	0	O.
3.6	5.0	2.9	3.8	5,853	42	NW.	N.	24	0	3	13	16	9	6	18	1	14	8	8	0	4	2	14	0	0	0	N.
4.8	6.3	4.4	5.2	6,868	42	NW.	NW.	12	2	2	11	19	5	3	32	7	9	13	9	0	6	11	28	0	0	0	D.
4.7	5.2	3.8	4.6	73,124	..	.....	S.	228	42	22	183	245	54	42	200	79	132	145	88	0	86	44	128	24	28	0	Y.

OSWEGO, N. Y.

[H=335. T=76. h=83.]

9.7	8.9	7.9	8.8	11,755	40	NW.	S.	8	2	6	8	31	9	12	17	0	0	6	25	0	19	17	30	0	0	0	J.
8.7	8.2	8.3	8.4	11,054	48	S.	NW.	6	8	5	14	16	3	10	21	1	2	6	20	0	16	12	28	0	1	2	F.
6.9	7.1	7.1	7.0	10,397	40	NW.	N.	26	5	1	12	16	3	8	21	1	4	10	17	0	11	13	30	0	0	1	M.
5.4	5.7	5.4	5.5	8,354	31	NW., S.	SE.	11	7	2	24	11	6	21	8	0	11	10	9	0	12	0	12	0	2	0	A.
5.0	4.2	3.8	4.3	5,643	24	SE.	SE.	17	6	1	22	15	7	14	6	5	11	14	6	0	4	0	0	0	2	0	M.
5.5	5.7	5.5	5.6	4,681	25	SE.	W.	15	3	1	17	16	8	19	7	4	8	10	12	0	10	0	0	0	3	0	J.
4.9	4.9	3.9	4.6	5,863	25	N.	W.	9	5	3	18	16	4	24	14	0	9	17	5	0	10	0	0	1	5	0	J.
5.6	4.7	3.5	4.6	5,922	30	NE.	SE.	14	5	4	19	17	6	10	18	0	10	17	4	0	10	0	0	0	1	3	A.
6.8	5.0	5.1	5.6	7,076	30	NW.	SE.	12	5	2	29	13	6	10	13	0	5	14	11	0	11	0	0	0	4	0	S.
7.7	6.9	6.1	6.9	8,347	42	W.	S.	7	4	0	10	28	9	11	23	1	4	12	15	0	20	1	7	0	1	0	O.
7.4	6.5	6.4	6.8	9,918	36	NW., W	SE, NW	6	9	3	16	15	13	12	16	0	6	6	18	0	15	2	15	0	0	0	N.
8.9	8.3	8.4	8.5	9,475	45	W.	SE.	7	7	9	24	13	6	12	15	0	1	7	23	0	16	9	26	0	0	0	D.
6.9	6.3	6.0	6.4	98,485	..	.....	SE.	138	66	37	213	207	80	163	179	12	71	129	165	0	154	54	148	1	19	3	Y.

PALESTINE, TEX.

[H=533. T=16. h=2.]

4.3	3.7	1.7	3.2	9,168	40	SW.	S.	8	16	4	5	26	15	2	17	0	14	14	3	0	5	2	13	0	0	0	J.
7.0	7.6	4.3	6.3	7,593	37	NW.	S.	14	11	6	3	24	8	3	15	0	4	13	11	0	10	0	2	0	1	0	F.
3.5	3.3	1.6	2.8	7,711	36	S.	S.	19	8	5	8	30	9	3	11	0	18	8	5	0	4	0	0	0	3	0	M.
4.6	4.7	1.5	3.6	7,753	32	NW.	S.	9	6	6	15	46	1	1	6	0	15	12	3	0	3	0	0	0	1	0	A.
5.0	6.0	3.6	4.9	6,134	21	NE.	S.	4	10	10	19	38	2	3	5	2	11	12	8	0	11	0	0	2	7	0	M.
3.7	5.1	2.7	3.8	5,097	36	NE.	S.	4	8	18	21	35	0	1	2	1	14	10	6	0	8	0	0	10	7	0	J.
1.9	4.1	1.5	2.5	5,506	30	S.	S.	3	6	3	10	59	5	4	0	3	22	7	2	0	4	6	0	28	3	0	J.
4.2	6.7	3.7	4.9	5,494	36	S.	S.	2	14	17	11	42	3	1	3	0	11	15	5	0	8	0	0	22	1	0	A.
3.2	5.8	2.2	3.7	5,448	26	NW.	S.	5	25	4	11	34	4	4	3	0	17	9	4	0	7	0	0	7	1	0	S.
2.8	4.5	1.9	3.4	6,945	36	NE.	S.	25	19	3	6	32	4	0	4	0	18	7	6	0	5	0	0	0	2	0	O.
3.4	4.4	3.3	3.7	5,490	48	S.	S.	16	13	8	6	24	8	5	9	1	16	6	8	0	4	0	3	0	1	0	N.
7.6	7.8	6.2	7.2	7,533	36	NW.	N.	25	19	5	5	18	4	4	13	0	5	9	17	0	16	2	8	0	3	0	D.
4.4	5.3	2.8	4.2	79,872	..	.....	S.	134	155	89	120	408	63	31	88	7	165	122	78	0	85	4	26	69	30	0	Y.

***Monthly and yearly meteorological summaries*—Continued.**

PENSACOLA, FLA.

[Latitude, 30° 25′ N.; longitude, 87° 13′ W.]

Months and year.	Pressure. Mean.	Pressure. Maximum.	Pressure. Minimum.	Temperature. 7 a. m.	Temperature. 3 p. m.	Temperature. 10 p. m.	Temperature. Mean.	Temperature. Maximum.	Temperature. Minimum.	Temperature. Mean. Maximum.	Temperature. Mean. Minimum.	Dew point. 7 a. m.	Dew point. 3 p. m.	Dew point. 10 p. m.	Dew point. Mean.	Relative humidity. 7 a. m.	Relative humidity. 3 p. m.	Relative humidity. 10 p. m.	Relative humidity. Mean.	Precipitation. Total.	Precipitation. Max. 24 hours.
	In.	In.	In.	°	°	°	°	°	°	°	°	°	°	°	°					In.	In.
J ..	30.146	30.47	29.72	44.4	53.5	49.4	49.1	68	20	55.6	41.9	40	44	43	42	84	72	79	78	3.66	1.30
F ..	30.184	30.52	29.81	60.5	66.8	62.6	63.3	76	38	68.4	58.3	57	60	58	58	89	80	86	85	3.42	1.38
M ..	30.047	30.42	29.78	54.2	66.5	59.9	60.2	75	40	68.0	52.6	48	53	53	51	81	64	78	74	2.25	1.29
A ..	30.052	30.35	29.69	60.8	73.8	67.1	67.2	92	44	75.5	59.9	54	59	60	58	81	62	79	74	.95	.69
M ..	29.969	30.17	29.74	71.2	81.0	74.2	75.5	90	62	83.2	69.1	66	68	67	67	84	64	79	76	1.84	.65
J ..	29.961	30.10	29.78	75.8	84.0	78.1	79.3	89	65	85.5	72.7	69	69	70	69	81	63	76	73	14.11	10.70
J ..	29.978	30.13	29.60	77.8	86.9	80.7	81.8	99	71	89.0	75.5	73	75	74	74	85	69	81	78	4.96	1.10
A ..	29.927	30.08	29.68	76.6	86.9	81.2	81.6	93	69	88.5	74.9	72	74	73	73	84	66	76	76	3.42	.72
S ..	29.995	30.09	29.61	72.8	82.7	77.3	77.6	94	59	84.2	71.1	67	69	68	68	82	64	75	74	4.64	2.19
O ..	29.994	30.20	29.40	63.2	73.8	67.7	68.2	83	38	75.4	60.9	58	61	60	59	83	66	77	75	5.52	2.32
N ..	30.090	30.40	29.82	54.5	66.4	59.8	60.2	76	28	68.4	52.4	48	55	52	52	80	68	77	75	.65	.47
D ..	30.056	30.52	29.50	49.8	57.2	53.5	53.5	70	30	59.6	47.2	45	50	48	48	85	78	84	82	6.89	2.02
Y ..	30.033	30.52	29.40	63.5	73.3	67.6	68.1	99	20	75.1	61.4	58	61	60	60	83	68	79	76	52.31	.....

PHILADELPHIA, PA.

[Latitude, 39° 57′ N.; longitude, 75° 9′ W.]

J ..	29.947	30.54	29.30	28.6	35.0	30.8	31.5	66	8	39.5	23.7	21	23	22	22	74	63	70	69	3.23	.66
F ..	30.107	30.82	29.25	33.0	39.3	36.1	36.1	66	18	43.4	29.1	27	30	30	29	78	72	79	77	4.46	1.26
M	29.855	30.63	29.19	32.3	41.2	35.7	36.4	54	22	43.8	28.9	22	26	25	24	69	56	67	64	2.59	1.17
A ..	29.897	30.55	29.14	43.4	56.5	49.6	49.8	84	28	60.4	41.1	32	32	37	34	67	43	64	58	2.00	.76
M	29.936	30.22	29.49	59.7	76.0	64.5	66.7	88	49	78.3	57.9	51	52	53	52	75	46	69	63	.62	.24
J ..	29.905	30.22	29.56	65.2	78.9	68.6	70.9	93	53	81.1	62.0	58	58	59	58	77	50	72	66	6.81	2.88
J .	29.873	30.09	29.57	75.3	85.9	77.8	79.7	100	68	89.0	72.3	69	68	69	68	81	57	76	71	7.14	2.75
A ..	29.883	30.19	29.62	68.3	79.4	71.3	73.0	90	56	82.0	65.9	61	60	62	61	79	55	73	69	2.31	1.24
S ..	30.007	30.35	29.49	59.2	70.2	62.7	64.0	86	42	71.9	57.4	52	52	54	53	79	55	75	70	4.92	2.63
O ..	29.930	30.38	29.41	50.9	61.2	54.8	55.6	84	31	64.0	48.8	43	44	44	44	76	55	68	66	1.68	1.49
N ..	29.963	30.70	29.34	41.3	50.3	44.3	45.3	70	25	53.2	38.8	32	32	32	32	72	52	63	62	1.38	.48
D ..	30.013	30.81	29.22	33.9	40.6	36.1	36.9	59	14	43.8	30.4	27	28	28	28	77	63	74	71	5.06	1.31
Y ..	29.943	30.82	29.14	49.3	59.5	52.7	53.8	100	8	62.5	46.4	41	42	43	42	75	56	71	67	42.17	.....

PIKE'S PEAK, COLO.

[Latitude, 38° 50′ N.; longitude, 105° 2′ W.]

J ..	17.411	17.77	17.18	- 1.0	2.2	0.0	0.4	19	-21	5.8	- 6.1	- 5	- 2	- 4	- 4	82	89	85	83	.71	.19
F ..	17.477	18.00	16.98	1.1	7.9	3.0	4.0	27	-23	11.0	- 2.3	- 3	3	- 1	0	84	80	86	83	.46	.10
M	17.725	17.98	17.40	12.8	18.0	13.0	14.6	31	- 5	19.0	9.8	6	10	6	8	76	72	75	74	2.52	2.06
A ..	17.640	17.97	17.24	11.1	18.9	14.2	14.7	38	- 6	22.0	8.6	5	12	9	9	79	79	82	80	4.52	2.41
M	17.862	18.05	17.33	23.2	31.0	25.2	26.5	44	- 2	33.7	20.3	18	23	21	21	80	74	85	79	2.00	1.43
J ..	17.967	18.15	17.75	33.1	41.2	34.6	36.3	56	21	44.0	29.8	26	30	28	28	76	67	78	74	1.44	.46
J ..	18.092	18.21	17.96	35.9	43.7	37.8	39.1	55	29	46.5	33.8	28	34	31	31	70	66	72	69	6.52	1.39
A ..	18.027	18.12	17.78	34.3	42.7	37.0	38.0	56	22	47.0	32.2	25	29	29	28	71	62	77	70	3.84	1.08
S ..	18.012	18.14	17.80	29.8	37.6	32.8	33.4	51	15	41.2	28.4	24	27	28	26	80	69	83	77	1.80	.57
O ..	17.846	18.11	17.49	20.4	28.0	23.2	23.9	44	0	31.1	17.6	14	20	16	17	78	73	79	76	.45	.16
N ..	17.751	18.05	17.27	16.2	21.1	17.6	18.3	36	-14	25.9	12.8	a1	a6	5	a4	a59	a62	64	a62	.90	.44
D ..	17.496	17.81	17.04	.7	4.1	1.9	2.2	25	-39	11.6	- 4.8	-a4	- 4	- 7	-a5	a78	72	73	a74	1.04	.29
Y ..	17.775	18.21	16.98	18.1	24.7	20.0	20.9	56	-39	28.2	15.0	11	16	14	13	76	72	78	75	26.20	.....

PITTSBURGH, PA.

[Latitude, 40° 32′ N.; longitude, 80° 2′ W.]

J ..	29.081	29.65	28.56	27.4	33.5	30.4	30.4	70	4	46.2	21.7	20	24	24	27	74	69	77	73	1.92	.59
F ..	29.228	29.82	28.44	36.4	41.1	38.0	38.5	67	15	46.5	30.9	31	31	33	32	80	70	81	77	6.52	2.01
M ..	29.084	29.64	28.53	32.0	41.8	36.0	36.8	68	15	45.9	29.0	24	26	27	26	74	57	70	67	1.49	0.32
A ..	29.079	29.60	28.40	44.1	59.1	50.6	51.3	84	24	62.3	41.4	36	40	40	39	75	52	67	65	4.29	2.56
M	29.099	29.37	28.77	61.0	76.6	67.0	68.2	95	47	79.3	57.7	54	56	57	55	78	51	71	66	5.78	2.25
J ..	29.106	29.47	28.80	66.4	79.2	71.0	72.2	94	52	81.8	61.9	58	58	60	59	76	51	70	66	4.50	1.64
J ..	29.083	29.28	28.84	74.0	88.8	78.9	80.6	101	60	90.2	70.4	66	64	66	66	77	45	66	63	9.51	3.85
A ..	29.102	29.41	28.83	65.9	79.6	71.5	72.3	93	46	a81.6	a62.2	59	58	60	59	79	50	68	66	2.16	.79
S ..	29.205	29.51	28.76	58.9	72.0	64.5	65.1	92	36	74.3	54.8	50	51	a52	a51	74	52	a65	a64	2.03	.85
O ..	29.147	29.52	28.71	47.4	59.5	52.2	53.0	80	20	62.5	43.8	40	44	42	42	76	60	70	69	.39	.20
N ..	29.171	29.89	28.47	41.0	49.1	43.9	44.7	74	14	52.3	35.8	33	35	34	34	74	61	69	68	1.37	.67
D ..	29.184	29.92	28.64	33.1	39.5	36.6	36.3	62	8	43.2	28.8	26	28	28	27	75	67	71	71	1.99	.80
Y ..	29.131	29.92	28.40	49.0	60.0	53.4	54.1	101	4	63.8	44.9	42	43	44	43	76	57	71	68	41.95	.....

Monthly and yearly meteorological summaries—Continued.

PENSACOLA, FLA.

[H=30. T=20. h=35.]

Cloudiness (in tenths).				Wind.													Number of days—										
7 a. m.	3 p. m.	10 p. m.	Mean.	Total (miles).	Maximum.	Direction.	Prevailing direction.	North.	Northeast.	East.	Southeast.	South.	Southwest.	West.	Northwest.	Calms.	Clear.	Fair.	Cloudy.	Foggy.	Rain or snow.	Max. below 32°.	Min. below 32°.	Max. above 90°.	Thunder-storms.	Auroras.	Months and year.
5.6	4.7	3.8	4.7	5,518	28	N.	N.	23	14	15	9	11	14	5	2	0	10	14	7	0	11	0	7	0	2	0	J.
4.7	6.0	3.9	4.9	4,853	28	SE.	E.	7	7	21	18	14	10	5	2	0	7	14	7	1	12	0	0	0	2	0	F.
3.5	4.2	2.4	3.4	5,077	24	S.	N.	18	8	4	11	13	17	14	6	2	18	8	5	0	5	0	0	0	4	0	M.
3.9	2.1	1.4	2.5	5,428	21	W., SW	S.	13	10	2	6	21	18	12	7	1	16	12	2	0	4	0	0	1	1	0	A.
5.6	5.3	3.2	4.7	5,851	22	E.*	SW., W.	9	3	7	9	8	26	26	3	2	10	16	5	0	11	0	0	0	7	0	M.
5.5	4.4	2.9	4.3	5,607	22	SW, SE	SW.	6	12	11	10	11	28	6	5	1	13	10	7	0	11	0	0	0	4	0	J.
4.8	5.4	3.5	4.6	5,036	36	NE.	NW.	8	4	4	2	2	24	19	25	5	7	21	3	0	16	0	0	10	9	0	J.
3.9	4.8	1.6	3.4	4,036	24	NE., SW.	SW.	8	10	6	1	8	29	13	15	3	14	14	3	0	11	0	0	6	5	0	A.
4.4	4.5	2.7	3.9	6,073	30	W. S.	E.	5	12	16	11	12	13	14	5	2	16	8	6	0	6	0	0	4	0	0	S.
4.7	4.9	4.0	4.5	6,274	48	SW.	NE.	23	24	12	15	3	3	1	9	3	10	14	7	0	7	0	0	0	0	0	O.
4.3	4.4	3.5	4.1	4,322	20	N.	E.	17	22	23	9	2	5	4	6	2	13	10	7	0	7	0	1	0	0	0	N.
7.2	7.2	5.3	6.6	6,325	36	SW.	NE.	19	26	9	6	8	6	5	13	1	5	10	16	0	16	0	1	0	0	0	D.
4.8	4.8	3.2	4.3	65,000	..	.....	SW.	156	152	130	107	113	193	124	98	22	139	151	75	1	115	0	9	21	34	0	Y.

PHILADELPHIA, PA.

[H=117. T=168. h=166.]

5.7	6.8	3.6	5.4	8,623	41	NW.	NW.	9	16	1	4	13	16	4	30	0	8	15	7	0	13	10	24	0	0	0	J.
5.3	7.2	5.4	6.0	a7,582	44	NW.	NW.	8	14	6	5	9	7	12	23	0	6	10	12	1	17	3	18	0	1	0	F.
5.7	6.6	4.1	5.5	10,243	38	NW.	NW.	27	12	4	5	8	4	0	33	0	7	14	10	0	14	0	21	0	0	0	M.
5.6	6.2	4.9	5.6	8,447	37	NW.	NW.	5	13	5	3	18	9	10	27	0	8	14	8	0	11	0	5	0	0	0	A.
5.1	4.9	2.6	4.2	5,101	30	E.	E.	6	11	22	4	16	16	12	5	1	11	14	6	0	8	0	0	0	3	0	M.
5.2	5.3	4.4	5.0	6,198	30	E.	E.	10	3	20	7	16	12	14	7	1	9	14	7	0	12	0	0	4	5	0	J.
5.9	6.0	4.6	5.5	6,315	34	W.	S.	1	5	14	9	25	14	17	7	1	9	11	11	0	11	0	0	18	8	0	J.
4.9	6.7	3.6	5.1	5,708	45	W.	N.	17	12	5	10	15	12	7	13	2	8	14	9	0	8	0	0	1	5	0	A.
5.1	6.8	5.4	5.8	6,048	36	SW.	N.	20	14	4	5	12	16	7	8	3	9	8	12	0	12	0	0	0	1	0	S.
6.0	6.6	5.3	6.0	7,252	36	SW., W.	W.	14	11	4	0	11	14	19	12	8	8	10	13	0	9	0	1	0	0	0	O.
6.3	5.5	3.8	5.2	7,078	44	N.	W.	13	4	4	0	14	11	25	15	4	10	12	8	0	7	0	4	0	0	0	N.
6.6	5.6	5.7	6.0	7,855	45	NW.	NW.	13	19	4	5	4	7	17	23	1	6	14	11	0	11	4	16	0	0	0	D.
5.6	6.2	4.4	5.4	86,448	..	.....	NW.	143	134	93	57	161	138	144	203	21	99	150	114	1	133	17	89	23	23	0	Y.

PIKE'S PEAK, COLO.

[H=14,134. T=5. h=1.]

1.7	3.7	2.7	3.0	28,691	98	NW.	NW.	11	2	0	0	1	12	28	38	1	15	12	1	0	14	31	31	0	0	0	J.
1.6	4.5	3.1	3.1	21,002	86	NW.	SW.	3	1	0	0	2	38	27	10	3	13	13	2	0	13	28	28	0	0	0	F.
3.4	4.3	3.6	3.8	15,859	68	NW.	NW.	21	6	1	0	3	7	20	33	2	12	15	4	1	9	31	31	0	1	0	M.
3.1	5.1	3.7	4.0	17,217	72	W.	W.	5	8	0	0	6	20	28	18	5	12	14	4	0	13	24	30	0	2	0	A.
2.5	5.9	3.7	4.0	13,124	72	SW.	SW.	15	8	4	0	6	33	16	10	1	8	20	3	0	13	9	31	0	3	0	M.
1.5	6.0	4.3	3.9	13,290	74	SW.	SW.	12	10	2	4	6	29	17	9	1	12	15	3	0	15	0	22	0	15	0	J.
1.8	7.7	4.8	4.8	10,204	54	W.	SW.	9	18	3	3	1	22	16	21	0	4	26	1	0	24	0	11	0	27	0	J.
2.3	6.6	5.2	4.7	10,951	60	W., SW	SW.	5	7	4	5	2	31	12	24	0	6	21	4	0	21	0	13	0	10	0	A.
3.2	6.1	4.0	4.4	12,892	60	W.	W.	9	9	4	6	8	23	25	5	1	9	16	5	0	12	3	22	0	2	0	S.
1.7	3.6	2.6	2.6	15,662	78	NW.	W.	12	3	1	3	5	18	29	22	0	18	13	0	0	7	16	31	0	0	0	O.
2.2	3.3	2.7	2.7	16,069	78	NW.	W.	12	4	0	0	7	14	31	21	1	15	14	1	0	8	27	30	0	0	0	N.
2.6	4.7	2.8	3.4	12,131	84	W.	NW.	15	22	0	0	1	4	23	28	0	15	13	3	0	13	31	31	0	0	0	D.
2.3	5.1	3.7	3.7	187,092	..	.....	W.	129	98	19	21	48	254	272	239	15	139	195	31	1	162	200	311	0	50	0	Y.

PITTSBURGH, PA.

[H=847 T=130. h=126.]

7.8	8.6	6.5	7.6	7,098	32	S.	S.	5	8	5	5	28	18	16	8	0	0	14	17	0	23	10	22	0	0	0	J.
7.9	8.5	6.8	7.7	6,190	40	W.	W.	12	16	8	4	11	7	19	7	0	1	11	16	0	22	2	16	0	3	0	F.
6.8	7.3	6.2	6.8	6,128	34	W.	NW.	19	13	7	2	7	2	12	31	0	5	12	14	0	17	2	22	0	1	0	M.
5.2	6.2	3.3	4.9	5,054	30	SW.	W.	11	12	8	4	9	8	19	15	4	10	14	6	0	10	0	2	0	1	0	A.
3.6	6.3	3.9	4.6	3,924	24	S.	NE.	14	17	12	7	9	5	4	16	9	10	11	10	0	15	0	0	2	9	0	M.
3.8	5.7	2.2	3.9	3,769	24	SW.	W.	13	11	10	4	15	4	16	12	5	15	9	6	0	12	0	0	5	6	0	J.
4.2	5.0	3.8	4.3	3,473	39	S.	NW.	12	6	4	8	10	10	19	20	4	9	20	2	0	15	0	0	14	8	0	J.
4.5	6.5	2.4	4.5	a3,524	..	.....	NW.	12	12	6	8	6	6	16	26	1	7	21	3	0	11	0	0	5	4	0	A.
6.2	6.9	4.4	5.8	3,854	20	NE.SW	N.	30	16	11	5	5	4	6	12	1	4	18	8	0	14	0	0	1	1	0	S.
7.4	6.3	4.8	6.2	5,335	40	SW.	N.	28	5	3	2	8	11	16	20	0	5	14	12	0	6	0	4	0	1	0	O.
6.3	5.6	4.2	5.4	5,650	30	E., S., NW.	NW.	15	3	3	7	16	10	12	24	0	10	5	15	0	7	1	10	0	0	0	N.
6.8	7.8	6.0	6.9	5,721	34	SW.	W.	7	10	9	7	11	8	23	18	0	4	11	16	0	14	3	18	0	0	0	D.
5.9	6.7	4.5	5.7	59,720	..	.....	NW.	178	129	86	63	135	93	178	209	24	80	160	125	0	166	18	94	25	34	0	Y.

* Also other directions.

Monthly and yearly meteorological summaries—Continued.

POPLAR RIVER, MONT.

[Latitude, 48° 8′ N.; longitude, 105° 10′ W.]

Months and year.	Pressure.			Temperature.								Dew point.				Relative humidity.				Precipitation.	
										Mean.											
	Mean.	Maximum.	Minimum.	7 a. m.	3 p. m.	10 p. m.	Mean.	Maximum.	Minimum.	Maximum.	Minimum.	7 a. m.	3 p. m.	10 p. m.	Mean.	7 a. m.	3 p. m.	10 p. m.	Mean.	Total.	Max. 24 hours.
	In.	In.	In.	°	°	°	°	°	°	°	°	°	°	°	°					In.	In.
J	27.735	28.39	27.09	-12.7	0.1	- 6.5	- 6.4	42	-40	7.5	-18.1	17	- 7	-13	-12	83	73	74	77	.49	.18
F	27.922	28.54	27.32	-17.1	- 1.2	- 7.3	- 8.5	43	-45	2.7	-20.8	-20	-10	-12	-14	87	69	80	79	.58	.15
M	27.887	28.54	27.24	17.5	33.9	27.2	26.2	59	-12	39.9	15.5	10	23	21	18	72	65	77	71	.14	.08
A	27.763	28.17	27.28	31.7	53.4	44.1	43.1	87	12	56.6	29.8	25	36	36	32	75	56	74	68	.31	.28
M	27.781	28.43	27.36	44.4	67.8	59.5	57.2	99	29	73.1	42.4	38	43	44	42	80	47	60	62	1.04	.50
J	27.759	28.11	27.36	56.3	74.0	64.9	65.1	101	39	77.8	53.1	50	53	54	52	80	50	70	66	4.19	1.00
J	27.863	28.05	27.61	56.7	77.4	68.7	67.6	97	42	81.0	53.1	52	56	59	56	85	51	72	69	2.10	1.41
A	27.838	28.22	27.48	54.7	73.4	64.8	64.3	94	39	77.6	51.5	51	57	57	55	88	60	76	75	3.72	2.58
S	27.865	28.30	27.51	45.4	68.8	59.2	57.8	89	27	72.0	42.3	41	51	51	48	84	55	74	71	.90	.58
O	27.910	28.37	27.24	28.5	49.5	39.1	39.0	80	- 2	53.4	25.7	24	35	34	31	83	62	83	76	1.37	.75
N	27.881	28.37	27.40	15.3	35.6	23.8	24.9	70	-34	38.8	11.9	10	24	18	17	84	66	78	76	.39	.24
D	27.877	28.57	27.39	- 0.5	12.3	5.1	5.6	43	-29	17.9	- 6.1	- 6	6	1	1	80	78	84	81	.28	.10
Y	27.840	28.57	27.09	26.7	45.4	36.9	36.3	101	-45	49.9	23.4	22	31	29	27	82	61	75	73	15.51	.....

PORT ANGELES, WASH.

[Latitude, 48° 7′ N.; longitude, 123° 6′ W.]

J	29.893	30.40	29.21	36.2	41.2	38.0	38.5	50	27	44.2	33.1	35	37	36	36	95	86	91	91	6.20	1.06
F	29.918	30.38	29.40	24.3	33.8	28.6	28.9	53	3	37.1	21.2	23	28	27	26	95	79	94	89	4.68	1.10
M	30.034	30.54	29.43	36.0	44.8	41.4	40.7	53	24	47.5	33.9	35	39	39	38	96	81	91	89	3.65	1.21
A	30.014	30.45	29.44	36.9	47.9	45.5	43.4	54	29	50.6	35.7	36	40	40	39	95	75	82	84	1.16	.33
M	29.992	30.36	29.38	41.7	53.7	53.4	49.6	74	30	58.5	40.6	40	45	46	44	94	74	77	82	2.11	.79
J	30.022	30.35	29.66	45.7	55.5	55.3	52.2	80	35	59.7	44.7	44	48	48	47	93	75	77	82	1.12	.50
J	30.084	30.24	29.89	47.8	58.0	57.0	54.3	78	37	61.6	46.4	46	51	51	50	95	79	80	85	.56	.52
A	29.987	30.27	29.76	48.7	59.2	57.3	55.1	82	39	63.2	47.3	48	53	53	51	96	81	86	88	.14	.13
S	30.005	30.25	29.67	45.7	55.6	52.1	51.1	73	32	59.6	43.6	44	50	50	48	96	82	92	90	1.15	1.09
O	30.138	30.48	29.62	41.8	50.7	45.5	46.0	63	29	53.2	38.7	41	46	44	44	98	85	96	93	2.89	1.27
N	30.033	30.54	29.45	38.9	45.7	40.0	41.5	61	24	47.1	33.5	37	39	38	38	93	80	94	89	4.52	1.81
D	29.909	30.66	29.16	36.6	42.8	38.4	39.3	52	29	44.7	33.6	34	39	36	36	92	86	92	90	6.07	1.89
Y	30.002	30.66	29.16	40.0	49.1	46.0	45.0	82	3	52.2	37.7	38	43	42	41	95	80	88	88	.....	.....

PORT HURON, MICH.

[Latitude, 43° 0′ N.; longitude, 82° 26′ W.]

J	29.236	29.80	28.54	17.3	22.2	17.6	19.0	49	- 9	25.8	10.2	11	16	11	13	76	77	76	76	2.03	.41
F	29.426	30.15	28.40	21.4	27.5	23.5	24.1	53	1	29.7	17.1	15	22	18	18	76	78	79	78	4.86	1.24
M	29.343	30.00	28.67	22.1	29.1	25.7	25.6	46	4	30.9	19.5	17	22	20	20	81	74	79	78	1.20	.67
A	29.276	29.82	28.59	37.0	46.7	41.4	41.7	74	16	49.9	32.6	31	37	34	34	80	70	76	75	.80	.46
M	29.324	29.63	28.92	52.4	63.2	55.8	57.1	89	40	65.9	48.4	47	53	49	50	82	71	77	77	2.24	1.06
J	29.313	29.73	28.94	60.4	70.8	62.1	64.4	88	48	74.0	51.8	56	57	57	57	88	65	83	79	2.44	.73
J	29.287	29.50	28.94	68.8	80.3	71.2	73.4	99	53	82.5	63.5	63	63	65	64	82	58	80	73	1.47	.49
A	29.327	29.62	29.06	61.0	73.2	65.7	66.6	92	44	75.0	56.1	55	57	59	57	80	60	79	73	1.87	.61
S	29.414	29.73	28.95	53.8	65.7	58.2	59.2	89	32	67.1	49.1	50	51	51	50	86	50	78	74	2.48	1.26
O	29.335	29.79	28.83	41.6	51.5	45.2	46.1	77	20	53.4	38.3	38	36	38	38	88	59	76	74	1.42	.69
N	29.344	30.21	28.61	33.2	40.7	36.9	36.9	60	12	43.6	29.2	30	29	30	30	88	66	77	77	1.79	.72
D	29.371	30.17	28.81	27.2	31.2	27.6	28.7	52	6	33.4	22.5	25	25	24	24	91	79	86	85	2.22	1.08
Y	29.333	30.21	28.40	41.4	50.2	44.2	45.3	99	- 9	52.6	36.8	36	39	38	38	83	68	79	77	24.82	.....

PORTLAND, ME.

[Latitude, 43° 39′ N.; longitude, 70° 15′ W.]

J	29.861	30.57	29.68	15.4	22.5	18.3	18.7	47	-15	27.0	9.3	12	16	15	14	85	76	87	83	3.89	.82
F	30.031	30.78	28.95	18.6	25.9	22.0	22.2	42	- 2	29.7	14.7	13	16	16	15	81	70	78	76	5.73	1.73
M	29.729	30.74	28.88	24.5	33.2	28.6	28.8	46	0	35.2	21.6	17	21	22	20	76	64	76	72	4.15	1.19
A	29.827	30.54	29.00	37.2	44.3	39.1	40.2	70	22	47.3	32.3	25	28	28	27	65	56	67	63	4.96	1.76
M	29.942	30.29	29.48	53.4	66.7	52.9	55.7	87	41	63.9	47.5	43	43	44	43	72	58	75	68	1.93	1.34
J	29.900	30.27	29.50	60.1	64.6	59.7	61.5	89	43	69.2	53.4	53	52	53	52	78	68	80	75	4.07	1.39
J	29.841	30.08	29.45	68.0	74.1	68.1	70.1	96	57	77.6	63.2	62	63	63	63	84	71	85	80	4.70	1.10
A	29.847	30.23	29.48	62.6	70.2	62.3	64.8	86	48	72.3	56.9	55	56	56	56	78	63	82	75	6.56	2.20
S	29.938	30.33	29.30	53.1	62.9	55.3	57.1	75	36	65.4	48.8	47	48	48	48	79	60	78	72	.70	.38
O	29.866	30.43	29.20	43.8	52.5	46.6	47.0	69	28	55.1	40.7	37	38	38	38	78	61	73	71	2.47	.87
N	29.868	30.75	28.99	34.4	42.5	36.3	37.7	66	8	45.0	30.0	26	28	27	27	74	60	71	68	4.74	1.75
D	29.933	30.86	28.88	24.1	32.0	27.7	27.9	55	- 2	34.5	21.2	18	23	21	21	79	72	76	76	5.17	2.07
Y	29.882	30.86	28.88	41.2	48.8	43.1	44.4	96	-15	51.8	36.6	34	36	36	35	78	65	77	73	49.07	.....

Monthly and yearly meteorological summaries—Continued.

POPLAR RIVER, MONT.

[H=2,002. T=3. h=2.]

Cloudiness (in tenths).				Wind.													Number of days—										
7 a. m.	3 p. m.	10 p. m.	Mean.	Total (miles).	Maximum.	Direction.	Prevailing direction.	North.	Northeast.	East.	Southeast.	South.	Southwest.	West.	Northwest.	Calms.	Clear.	Fair.	Cloudy.	Foggy.	Rain or snow.	Max. below 32°.	Min. below 32°.	Max. above 90°.	Thunder-storms.	Auroras.	Months and year.
4.5	5.3	3.8	4.5	4,199	40	W.	W.	16	11	12	2	0	2	32	4	14	12	12	7	0	7	30	31	0	0	2	J.
2.6	4.4	2.4	3.1	3,231	40	NW.	W.	7	12	5	2	1	3	29	8	17	16	10	2	0	7	26	28	0	0	10	F.
4.6	5.3	3.7	4.5	6,467	45	NW.	W.	23	11	7	11	4	3	25	9	0	8	21	2	0	4	7	30	0	0	4	M.
4.1	7.1	4.4	5.2	7,423	48	NW.	N.	25	14	10	8	2	4	18	9	0	5	21	4	0	4	0	20	0	2	6	A.
2.9	4.6	3.5	3.7	8,841	46	N.	N.	37	2	6	3	9	3	29	4	0	15	12	4	0	9	0	4	2	2	6	M.
2.5	4.2	4.4	3.7	6,975	52	N.	W.	14	6	21	11	4	2	24	5	3	13	16	1	0	15	0	0	3	9	0	J.
3.5	4.8	3.6	4.0	4,879	36	W.	W.	19	15	20	2	5	0	21	6	5	9	21	1	0	10	0	0	4	10	3	J.
4.8	5.3	3.2	4.4	5,189	36	NE. N. NW.	E.	16	14	25	16	4	0	9	4	5	8	17	6	0	11	0	0	3	10	5	A.
2.7	3.6	2.7	3.0	4,776	44	NW.	W.	15	4	13	13	4	6	17	10	8	16	11	3	0	6	0	2	0	3	8	S.
3.8	4.9	3.3	4.0	5,245	48	NW.	W.	7	6	8	5	5	2	34	11	15	15	10	6	0	9	3	24	0	0	5	O.
3.3	4.8	2.7	3.6	4,636	60	NW.	W.	10	6	6	3	5	2	39	7	12	12	17	1	0	5	9	27	0	0	0	N.
4.1	4.9	3.0	4.0	4,653	52	W.	W.	11	24	8	0	0	0	25	17	8	12	16	3	0	9	23	31	0	0	5	D.
3.6	4.9	3.4	4.0	66,514	...	.....	W.	200	125	141	76	43	27	302	94	87	141	184	40	0	96	98	197	12	36	54	Y.

PORT ANGELES, WASH.

[H=14. T=20. h=12.]

7.5	8.5	6.3	7.4	3,261	23	SW.	S.	0	0	5	9	44	15	14	1	5	2	13	16	0	28	0	15	0	0	0	J.
7.0	7.0	5.7	6.6	3,711	25	NE.	S.	10	6	4	6	42	5	5	4	2	3	13	12	0	15	5	25	0	0	0	F.
6.5	7.0	7.2	6.9	3,488	29	W.	S.	2	10	6	10	42	3	16	4	0	4	12	15	0	18	0	12	0	0	0	M.
5.8	6.6	7.0	6.5	4,328	29	W.	S.	3	1	7	3	35	11	21	9	0	3	17	10	0	14	0	10	0	0	1	A.
4.7	4.4	4.9	4.7	4,166	29	E., W.	S.	2	7	13	10	28	3	18	11	1	12	8	11	0	12	0	3	0	0	0	M.
6.2	5.9	5.2	5.8	4,749	24	W.	W.	2	1	8	2	24	2	32	18	1	6	17	7	0	8	0	0	0	0	0	J.
4.3	2.9	2.5	3.2	5,554	31	W.	W.	2	0	4	1	22	4	40	18	2	17	8	6	0	3	0	0	0	1	0	J.
4.1	3.3	1.9	3.1	4,011	24	W.	S.	1	5	11	3	26	8	20	16	3	15	15	1	0	2	0	0	0	0	0	A.
4.9	5.4	4.7	5.0	3,084	23	W.	S.	2	1	14	6	38	6	18	3	2	7	15	8	0	4	0	0	0	0	0	S.
5.6	6.1	4.7	5.5	2,757	30	W.	S.	3	5	13	12	43	4	10	2	1	7	17	7	0	15	0	2	0	0	0	O.
7.1	6.8	6.3	6.7	2,739	20	W.	S.	0	5	12	11	42	4	10	3	3	2	12	16	0	14	0	14	0	0	0	N.
6.9	8.6	5.9	7.1	3,018	26	E.	S.	0	3	6	8	54	12	9	1	0	1	16	14	0	19	0	12	0	0	0	D.
5.9	6.0	5.2	5.7	44,866	...	.....	S.	27	44	103	81	440	77	213	90	20	79	163	123	0	152	5	93	0	1	1	Y.

PORT HURON, MICH.

[H=639. T=70. h=66.]

7.7	7.3	7.0	7.3	10,811	42	W.	S.	3	5	10	3	36	12	19	11	0	3	12	16	0	21	21	30	0	0	0	J.
6.4	8.3	6.6	7.1	8,887	32	SW.	W.	6	7	8	10	15	10	20	7	1	3	12	13	0	19	15	26	0	0	0	F.
5.4	6.4	5.4	5.7	8,956	33	N., NW.	N.	25	9	6	5	8	6	15	19	0	9	7	15	0	11	10	29	0	0	0	M.
6.4	6.6	5.6	6.2	8,199	48	SW.	SW.	15	10	9	11	13	18	4	9	1	4	16	10	0	11	1	14	0	1	0	A.
3.9	5.6	3.1	4.0	6,722	30	SE.	NE.	5	40	3	7	17	10	8	3	0	13	14	4	0	10	0	0	0	2	1	M.
4.3	5.2	4.5	4.7	5,775	36	W.	NE.	11	29	8	7	9	14	11	1	0	10	14	6	0	13	0	0	0	5	2	J.
3.0	4.8	2.7	3.5	7,096	36	NW. N. E.	NE.	7	32	5	1	13	19	9	7	0	16	14	1	0	7	0	0	5	5	0	J.
3.4	5.7	5.1	4.7	5,853	28	NE.	NE.	11	33	10	8	8	11	5	7	0	11	11	9	0	8	0	0	3	3	0	A.
5.5	5.8	5.6	5.6	6,822	40	SW.	N., SW.	16	9	12	8	11	16	9	9	0	8	12	10	0	12	0	0	0	1	1	S.
6.9	6.4	5.5	6.3	9,160	54	SW.	SW.	4	4	1	5	13	32	16	18	0	5	14	12	0	10	0	10	0	0	0	O.
6.2	6.2	6.1	6.2	9,210	36	W., S.	NW. W.	2	9	6	8	14	15	18	18	0	5	12	13	0	11	5	15	0	0	0	N.
8.3	8.1	7.5	8.0	8,930	37	W.	SW.	2	4	6	15	20	21	7	18	0	2	9	20	0	16	11	26	0	0	0	D.
5.6	6.3	5.4	5.8	97,257	...	.....	NE.	107	191	84	88	171	184	141	127	2	89	147	129	0	149	73	150	8	17	4	Y.

PORTLAND, ME.

[H=99. T=83. h=71.]

5.4	6.5	6.3	6.1	6,124	32	N.	N.	27	6	1	0	6	20	14	17	2	5	15	11	0	15	18	28	0	0	0	J.
6.6	5.8	4.2	5.5	5,467	28	NW., W	W.	16	6	0	5	3	11	25	16	2	8	11	9	0	13	15	27	0	0	0	F.
7.1	5.9	5.5	6.2	7,379	36	SW.	NW.	21	2	4	3	10	6	22	24	1	7	11	13	0	13	7	26	0	0	0	M.
5.2	4.8	5.1	5.0	6,311	36	SE.	NW.	17	8	4	4	12	9	10	23	3	10	9	11	0	12	0	15	0	0	0	A.
5.1	5.3	2.8	4.4	5,558	28	NW.	S.	6	7	8	15	23	16	2	13	3	14	10	7	0	10	0	0	0	0	0	M.
6.0	1.7	3.7	4.8	5,439	27	S.	S.	2	8	6	12	26	17	8	10	1	10	13	7	2	14	0	0	0	1	0	J.
4.3	5.7	4.2	4.7	5,550	31	S.	S.	3	5	0	15	33	11	12	9	5	9	18	4	0	12	0	0	2	5	0	J.
3.4	5.0	2.7	3.7	5,101	45	S.	S., NW.	7	5	4	10	21	6	17	21	2	13	15	3	0	12	0	0	0	3	0	A.
3.9	6.0	3.7	4.5	4,798	27	SW.	NW	11	2	3	1	19	13	12	21	8	10	16	4	0	6	0	0	0	1	1	S.
5.5	5.9	5.5	5.6	5,181	36	S.	NW.	10	1	1	10	19	7	20	22	3	6	16	9	0	11	0	3	0	2	0	O.
6.2	5.9	3.7	5.3	6,122	37	SE.	NW.	12	4	1	7	11	17	16	18	4	11	9	10	1	11	1	18	0	0	0	N.
6.0	6.1	5.7	5.9	6,029	51	SW.	NW.	21	3	1	4	7	6	22	28	1	7	13	11	0	14	10	26	0	0	0	D.
5.4	5.6	4.4	5.1	69,059	...	.....	NW.	153	57	33	86	190	139	180	222	35	110	156	99	3	144	51	143	2	12	1	Y.

Monthly and yearly meteorological summaries—Continued.

PORTLAND, OREG.

[Latitude, 45° 32′ N.; longitude, 122° 43′ W.]

Months and year.	Pressure.			Temperature.								Dew point.				Relative humidity.				Precipitation.	
	Mean.	Maximum.	Minimum.	7 a. m.	3 p. m.	10 p. m.	Mean.	Maximum.	Minimum.	Mean. Maximum.	Mean. Minimum.	7 a. m.	3 p. m.	10 p. m.	Mean.	7 a. m.	3 p. m.	10 p. m.	Mean.	Total.	Max. 24 hours.
	In.	In.	In.	°	°	°	°	°	°	°	°	°	°	°	°					In.	In.
J..	29.988	30.40	29.36	41.3	44.5	42.6	42.8	58	29	47.7	36.8	39	40	41	40	93	84	94	90	12.31	2.75
F..	29.911	30.36	29.40	28.7	33.9	33.0	31.9	63	9	38.4	25.7	24	26	28	26	84	75	81	80	2.81	0.63
M..	30.041	30.47	29.64	43.8	52.8	51.5	49.4	75	31	58.8	40.9	40	41	43	41	86	67	74	75	8.00	1.36
A..	29.999	30.39	29.45	44.4	53.9	52.3	50.2	69	31	59.5	42.0	41	42	43	42	89	64	71	75	5.06	0.88
M..	29.960	30.27	29.58	50.0	61.8	62.0	57.9	99	34	69.3	48.2	44	43	44	44	80	53	56	63	4.77	1.29
J..	29.954	30.21	29.64	52.3	64.3	64.8	60.5	95	43	71.4	50.4	46	44	46	45	79	49	52	60	1.44	0.39
J..	29.995	30.20	29.74	56.2	69.6	72.4	66.1	93	46	78.5	54.2	51	51	52	51	83	53	50	62	0.03	0.03
A..	29.908	30.16	29.72	56.9	68.1	68.6	64.5	90	45	75.8	54.9	53	52	54	53	86	60	62	69	0.18	0.45
S..	29.943	30.25	29.66	51.8	64.4	62.5	59.6	87	40	71.9	49.3	49	50	51	50	90	63	68	74	3.06	1.17
O..	30.086	30.38	29.61	47.9	58.4	55.0	53.8	75	33	63.4	45.0	46	46	48	47	92	65	79	78	1.34	0.76
N..	30.010	30.38	29.62	41.2	47.3	44.7	44.4	68	25	50.6	38.5	38	39	40	39	90	74	84	83	3.43	0.90
D..	29.968	30.54	29.25	41.0	43.6	43.1	42.6	57	29	47.0	37.9	38	41	40	40	90	90	90	90	11.34	2.22
Y..	29.980	30.54	29.25	46.3	55.2	54.4	52.0	99	9	61.0	43.6	42	43	44	43	87	66	72	75	54.17	.....

RALEIGH, N. C.

[Latitude, 35° 45′ N.; longitude, 78° 37′ W.]

J..	29.721	30.18	29.22	33.4	44.4	37.8	38.5	69	8	47.5	29.4	30	32	32	31	87	65	79	77	3.04	0.86
F..	29.849	30.38	29.26	42.5	52.4	47.6	47.5	72	22	57.2	40.1	39	41	42	40	87	69	81	79	4.97	1.53
M	29.602	30.20	29.19	40.4	54.5	45.5	46.8	77	24	57.0	37.6	32	34	34	33	75	52	66	64	4.13	1.15
A..	29.618	30.16	28.99	49.8	65.8	56.0	57.2	86	30	68.9	46.5	40	41	44	42	72	45	68	61	2.10	1.06
M..	29.636	29.95	29.3.	64.0	78.4	68.0	70.1	90	46	80.8	60.4	59	58	59	59	85	52	74	70	3.46	0.80
J..	29.636	29.94	29.37	68.2	83.4	72.6	74.7	102	50	86.3	64.2	62	62	64	63	82	51	76	70	6.22	3.00
J..	29.616	29.86	29.41	74.7	87.7	77.1	79.8	103	66	91.1	71.5	72	73	72	72	91	64	85	80	6.11	1.97
A..	29.594	29.85	29.27	69.7	84.1	72.5	74.4	92	52	83.4	67.5	68	69	69	69	95	69	90	84	10.80	4.16
S..	29.726	29.96	29.39	61.1	75.1	65.7	67.3	92	40	77.1	59.3	59	62	62	61	92	65	89	82	2.17	1.18
O..	29.668	30.02	29.26	51.2	62.9	54.7	56.3	82	34	65.5	49.2	48	50	50	50	90	67	86	81	10.23	4.18
N..	29.730	30.26	29.15	40.3	53.7	44.5	46.2	71	25	56.2	38.2	36	40	39	38	84	61	82	76	1.00	0.34
D..	29.739	30.32	29.06	36.0	47.2	40.2	41.1	66	15	48.6	33.6	32	36	35	34	86	68	81	78	4.99	2.02
Y..	29.681	30.38	28.99	52.6	65.6	56.8	58.3	103	8	68.3	49.8	48	50	50	49	86	61	80	75	59.22	.....

RED BLUFF, CAL.

[Latitude, 40° 10′ N.; longitude, 122° 15′ W.]

J..	29.827	30.14	29.20	42.8	52.9	50.3	48.7	71	30	57.1	39.8	36	35	36	36	79	54	61	64	0.57	0.30
F	29.622	30.13	29.24	38.8	46.2	45.1	43.4	69	28	50.0	35.5	34	33	34	34	84	64	69	72	5.21	1.59
M	29.768	29.98	29.52	49.5	61.3	63.0	58.9	80	39	69.7	46.1	41	41	43	42	74	46	52	58	1.13	0.62
A..	29.657	29.98	29.32	51.2	65.6	63.8	60.2	90	38	71.6	47.7	38	35	38	37	63	37	41	48	1.76	0.82
M..	29.616	29.96	29.34	58.0	74.3	74.1	68.8	110	40	81.6	54.3	43	43	43	43	61	36	35	44	0.77	0.39
J..	29.481	29.68	29.19	64.6	82.6	84.0	77.1	105	47	89.7	62.3	44	42	42	43	52	26	26	34	0.26	0.14
J..	29.546	29.74	29.38	69.5	89.9	92.2	83.9	112	56	97.3	66.0	49	53	52	51	50	30	28	36	T	T
A..	29.462	29.62	29.28	68.1	87.8	87.9	81.3	107	55	94.8	64.6	48	50	48	49	50	29	26	35	T	T
S..	29.545	29.70	29.34	63.8	83.8	81.6	76.4	101	48	90.0	60.2	41	43	42	42	46	26	26	32	0.06	0.06
O..	29.656	29.88	29.43	61.3	78.2	73.9	71.1	96	47	83.7	57.2	32	32	32	32	36	21	24	27	0.00	0.00
N..	29.714	29.98	29.40	47.3	61.7	56.6	55.2	80	27	66.6	43.1	30	32	33	32	56	38	45	46	1.52	0.77
D..	29.805	30.05	29.08	44.0	51.9	48.8	48.2	68	32	55.6	40.2	35	36	36	36	76	60	66	67	2.32	0.83
Y..	29.645	30.14	29.08	54.9	69.9	68.4	64.4	112	27	75.6	51.4	39	40	40	40	60	39	42	47	13.60	.....

RIO GRANDE CITY, TEX.

[Latitude, 26° 23′ N.; longitude, 98° 48′ W.]

J..	29.926	30.45	29.59	48.4	69.2	58.5	58.7	90	25	73.3	45.4	38	33	39	37	72	32	53	52	0.02	0.02
F..	29.893	30.42	29.49	62.2	75.0	68.3	68.5	96	41	79.8	60.0	53	49	53	51	76	44	61	61	0.65	0.51
M	29.846	30.19	29.54	59.8	80.5	70.2	70.2	96	46	84.2	58.3	51	51	53	53	83	40	58	60	2.01	1.24
A..	29.765	30.13	29.39	67.2	84.9	75.1	75.7	104	48	88.1	66.0	61	57	60	59	81	42	62	62	0.16	0.26
M..	29.726	29.99	29.40	70.9	90.5	78.9	80.1	108	57	92.7	69.9	66	63	67	65	85	42	67	65	4.09	2.48
J..	29.690	29.82	29.53	74.7	89.0	80.6	81.4	101	67	91.6	73.3	72	69	72	71	90	55	74	73	8.08	3.47
J..	29.788	29.94	29.67	75.4	94.1	84.0	84.5	100	70	95.7	74.9	72	68	72	71	90	44	67	67	T	T
A..	29.707	29.82	29.57	76.5	95.2	84.6	85.4	101	71	97.4	75.7	73	68	71	71	90	42	65	66	1.65	0.88
S..	29.771	29.96	29.42	73.9	87.5	79.2	80.2	97	61	91.0	73.0	71	69	71	70	91	56	76	74	6.89	2.55
O..	29.850	30.18	29.41	63.0	77.9	69.5	70.1	91	43	80.8	61.6	59	59	61	59	87	55	75	72	2.12	0.77
N..	29.909	30.31	29.61	59.2	71.7	64.5	65.1	82	41	74.2	57.4	56	57	58	57	91	61	81	78	2.04	0.87
D..	29.891	30.38	29.43	47.2	61.6	53.8	54.2	83	25	62.7	43.3	44	46	47	45	88	60	79	76	4.38	2.55
Y..	29.813	30.45	29.39	64.9	81.4	72.3	72.9	108	25	84.3	63.2	60	57	60	59	85	48	68	67	32.19	....

Monthly and yearly meteorological summaries—Continued.

PORTLAND, OREG.

[H = 80. T = 65. h = 77.]

Cloudiness (in tenths).				Wind.													Number of days—										
7 a. m.	3 p. m.	10 p. m.	Mean.	Total (miles).	Maximum.	Direction.	Prevailing direction.	North.	Northeast.	East.	Southeast.	South.	Southwest.	West.	Northwest.	Calms.	Clear.	Fair.	Cloudy.	Foggy.	Rain or snow.	Max. below 32°.	Min. below 32°.	Max. above 90°.	Thunder-storms.	Auroras.	Months and year.
8.7	8.7	7.9	8.4	6,328	27	S.	S.	1	0	0	10	63	8	2	5	4	1	9	21	0	26	0	5	0	0	0	J.
6.5	6.9	6.1	6.5	4,457	21	S.	S.	7	12	8	13	27	4	0	8	5	6	10	12	0	20	6	19	0	0	0	F.
6.9	7.3	6.0	6.7	5,350	27	SW.	S.	6	5	5	6	35	7	1	19	9	6	11	14	0	19	0	1	0	0	0	M.
6.8	7.6	5.8	6.7	4,577	26	S.	NW.	4	1	2	7	28	7	4	30	7	2	15	13	0	19	0	1	0	0	0	A.
5.9	5.9	4.7	5.5	5,282	27	S.	NW.	9	6	1	6	28	7	1	32	3	9	12	10	0	13	0	0	3	0	0	M.
4.4	6.0	4.5	5.0	3,942	20	NE.	NW.	12	2	1	5	10	3	2	45	10	10	11	9	0	9	0	0	2	0	0	J.
3.5	3.8	2.4	3.2	4,191	17	NW.	NW.	9	0	0	6	9	1	0	49	19	18	7	6	0	1	0	0	2	0	0	J.
3.2	2.7	2.7	2.9	3,463	22	S.	NW.	4	0	1	6	12	1	1	55	13	17	10	4	0	3	0	0	1	0	0	A.
4.2	4.9	3.7	4.3	3,146	24	NE.	NW.	5	4	1	8	17	1	1	40	13	13	11	6	0	8	0	0	0	0	0	S.
4.9	5.9	4.0	4.9	2,761	20	S.	NW.	4	3	1	9	19	1	3	37	16	11	12	8	0	4	0	0	0	0	0	O.
5.7	7.5	4.6	5.9	3,279	28	S.	NW.	5	2	1	17	20	5	2	35	3	7	12	11	1	14	0	9	0	0	0	N.
8.9	8.7	7.5	8.4	5,323	36	S.	S.	4	1	5	11	56	2	0	11	3	2	6	23	0	21	0	3	0	0	0	D.
5.8	6.3	5.0	5.7	52,099	..	.....	NW.	70	36	26	104	324	47	17	366	105	102	126	137	1	157	6	38	8	0	0	Y.

RALEIGH, N. C.

[H = 375. T = 65. h = 2.]

4.9	5.2	3.9	4.7	.....	..	.....	S.	14	8	0	1	29	16	8	11	6	11	12	8	0	10	6	18	0	0	0	J.
7.4	8.0	4.6	6.7	4,680	..	.....	NE.	8	23	3	3	6	19	6	9	7	5	11	12	0	15	0	4	0	1	0	F.
3.6	6.0	3.0	4.2	5,976	26	NW.	NW.	18	15	5	1	6	16	9	21	2	13	11	7	0	10	0	8	0	2	0	M.
3.7	5.1	3.2	4.0	5,586	33	N.	N.	27	6	2	8	15	6	14	11	1	15	8	7	0	8	0	3	0	2	0	A.
5.3	6.7	3.9	5.3	3,853	18	S.	SW.	15	11	8	12	15	20	1	7	4	5	19	7	0	11	0	0	0	7	0	M.
4.1	6.1	3.2	4.5	4,303	26	N.	N.	25	15	2	5	11	8	10	10	2	10	13	7	0	11	0	0	7	8	0	J.
5.5	6.0	4.8	5.4	2,940	24	NE.	S.	6	2	1	4	29	22	5	19	5	10	12	9	0	13	0	0	18	7	0	J.
5.7	5.2	4.5	5.1	3,212	27	NW.	NE.	9	22	1	13	8	12	4	16	8	9	12	10	0	16	0	0	1	2	0	A.
4.4	5.0	2.4	3.9	2,443	21	NE.	SW. NE.	6	24	6	3	9	24	3	8	7	14	11	5	0	6	0	0	1	1	0	S.
4.4	5.0	4.7	4.7	3,773	27	N., NE., NW.	N.	27	12	4	0	1	21	5	16	7	15	4	12	0	11	0	0	0	0	0	O.
4.7	3.8	2.4	3.6	3,582	24	SW. NW.	SW.	17	5	1	3	1	30	2	23	8	14	12	4	0	8	0	5	0	0	0	N.
7.0	5.7	5.1	5.9	4,430	25	NW.	NW.	16	7	2	6	7	8	5	41	1	5	12	14	0	11	0	13	0	0	0	D.
5.1	5.6	3.8	4.8	.....	..	.....	SW.	188	150	35	59	137	202	72	192	58	126	137	102	0	130	6	51	27	30	0	Y.

RED BLUFF, CAL.

[H = 342. T = 53. h = 44.]

4.3	4.4	3.9	4.2	5,193	36	S.	N.	44	5	1	5	15	1	9	5	8	12	13	6	0	6	0	3	0	0	0	J.
5.7	6.6	5.5	5.9	6,562	40	S.	S.	35	1	0	2	39	0	4	1	2	7	7	14	0	15	0	6	0	0	0	F.
3.3	4.0	4.5	3.9	4,384	28	S.	N.	45	0	0	0	26	6	3	6	7	14	12	5	0	5	0	0	0	0	0	M.
3.7	4.3	4.3	4.1	6,371	30	S.	N.	41	0	1	3	25	0	16	1	3	15	9	6	0	6	0	0	0	1	0	A.
3.5	3.5	4.2	3.8	5,924	29	N.	S.	35	3	0	5	36	1	6	5	2	15	11	5	0	5	0	0	7	1	0	M.
2.0	2.8	2.9	2.6	6,042	29	S.	N.	40	1	1	2	32	1	0	8	5	19	11	0	0	4	0	0	18	0	0	A.
0.7	0.4	0.9	0.7	4,196	36	S.	S.	22	0	0	11	54	2	2	2	0	29	2	0	0	0	0	0	29	1	0	J.
0.0	0.3	0.3	0.2	4,173	22	N.	S.	23	1	0	25	35	2	2	2	3	30	1	0	0	0	0	0	24	0	0	A.
1.3	1.4	1.9	1.5	4,946	36	N.	N.	31	2	0	8	24	2	7	6	10	22	7	1	0	1	0	0	15	0	0	S.
0.6	2.1	0.6	1.1	6,571	42	NW.	N.	49	8	0	13	4	0	2	14	3	23	8	0	0	0	0	0	6	0	0	O.
2.6	4.1	4.0	3.6	3,715	36	N.	N.	57	0	0	0	13	0	1	9	10	17	7	6	0	4	0	2	0	0	0	N.
5.5	5.9	3.5	5.0	5,628	45	S., N.	N.	34	0	2	6	25	1	5	8	12	10	10	11	0	11	0	1	0	2	0	D.
2.8	3.3	3.1	3.1	63,705	..	.....	N.	456	21	5	80	328	16	57	67	65	213	98	54	0	57	0	12	99	5	0	Y.

RIO GRANDE CITY, TEX.

[H = 230. T = 17. h = 15.]

3.8	1.7	1.3	2.3	5,087	28	S.	N.	35	7	5	11	22	2	2	2	7	20	8	3	0	1	0	5	2	0	0	J.
6.8	5.2	3.2	5.1	5,754	28	S., N.	S.	24	2	7	3	34	1	2	8	3	7	15	6	0	5	0	0	3	0	0	F.
3.0	2.0	1.8	2.3	5,300	24	S., N.	N., S.	26	5	8	16	26	1	0	1	10	19	10	2	0	4	0	0	9	1	0	M.
3.9	4.3	2.8	3.7	6,840	27	S.	S.	9	1	9	28	34	1	0	3	5	14	13	3	0	2	0	0	8	0	0	A.
4.0	3.3	1.7	3.0	6,447	38	N.	SE.	5	5	12	30	29	3	4	2	3	15	15	1	0	6	0	0	21	5	0	M.
3.3	4.6	2.5	3.5	4,968	27	N.	S.	19	2	17	15	26	1	0	2	8	13	13	4	0	7	0	0	23	1	0	J.
1.5	2.9	0.7	1.7	6,664	21	E., S.	SE.	6	0	12	41	38	0	0	0	2	24	6	1	0	0	0	0	31	0	0	J.
2.6	3.7	1.8	2.7	6,201	21	S.	S.	1	0	14	34	37	1	0	0	6	19	10	2	0	4	0	0	30	0	0	A.
3.2	5.7	2.5	3.8	4,619	33	SE.	S.	16	2	13	13	19	4	3	5	15	15	11	4	0	12	0	0	21	0	0	S.
4.7	5.0	3.6	4.4	4,304	24	N.	N.	30	9	7	12	15	1	0	15	4	12	11	8	0	7	0	0	4	0	0	O.
4.9	6.0	5.2	5.4	3,424	24	N.	S.	14	0	8	14	17	5	4	12	10	9	12	9	0	6	0	0	0	0	0	N.
5.0	6.1	4.2	5.1	4,076	24	N.	N.	34	8	6	4	13	1	8	6	13	8	17	6	0	10	1	4	0	0	0	D.
3.9	4.2	2.6	3.6	63,684	..	.....	S.	213	47	118	221	310	21	23	56	86	175	141	49	0	64	1	9	152	7	0	Y.

Monthly and yearly meteorological summaries—Continued.

ROCHESTER, N. Y.

[Latitude, 43° 8′ N.; longitude, 77° 42′ W.]

Months and year.	Pressure.			Temperature.								Dew point.				Relative humidity.				Precipitation.	
	Mean.	Maximum.	Minimum.	7 a. m.	3 p. m.	10 p. m.	Mean.	Maximum.	Minimum.	Mean. Maximum.	Mean. Minimum.	7 a. m.	3 p. m.	10 p. m.	Mean.	7 a. m.	3 p. m.	10 p. m.	Mean.	Total.	Max. 24 hours.
	In.	In.	In.	°	°	°	°	°	°	°	°	°	°	°	°					In.	In.
J..	29.280	29.88	28.66	19.5	24.1	21.5	21.7	58	-5	31.8	13.5	16	19	18	17	85	80	87	84	1.34	0.27
F..	29.467	30.20	28.65	23.8	26.9	24.1	24.9	55	5	32.8	17.8	20	21	21	21	86	80	88	84	4.75	1.57
M.	29.313	30.06	28.59	24.7	29.3	26.3	26.8	54	9	34.2	19.8	a20	22	21	21	83	74	79	79	0.94	0.26
A..	29.316	29.93	28.48	38.4	47.4	39.9	41.9	72	20	52.2	32.9	29	31	29	30	71	55	65	63	2.51	1.41
M.	29.368	29.71	28.97	57.0	68.9	61.8	62.6	86	40	72.4	52.6	49	52	50	50	76	57	68	67	1.17	0.68
J..	29.345	29.74	29.02	61.4	70.7	64.5	65.5	85	49	74.1	56.0	57	59	58	58	85	68	80	78	1.51	0.42
J..	29.306	29.52	28.96	69.4	79.8	73.5	74.2	95	59	83.8	65.6	64	66	65	65	83	64	76	74	1.90	0.73
A..	29.335	29.65	29.05	60.5	72.7	66.0	66.4	89	44	75.4	57.3	55	58	57	57	84	61	74	73	1.59	0.56
S..	29.429	29.80	28.86	53.4	65.2	57.4	58.7	87	34	67.9	49.2	48	47	48	48	82	54	72	69	0.90	0.29
O..	29.331	29.81	28.76	43.0	50.7	45.5	46.4	76	24	54.5	38.6	39	38	38	38	85	64	75	75	1.31	0.34
N..	29.317	30.21	28.64	35.9	40.3	36.6	37.6	71	16	45.3	30.2	29	28	28	28	78	64	73	72	0.80	0.27
D..	29.364	30.26	28.78	26.9	31.0	29.3	29.1	52	3	35.5	22.8	22	25	25	24	83	81	85	83	1.58	0.52
Y..	29.348	30.26	28.48	42.8	50.6	45.5	46.3	95	-5	55.0	38.0	37	39	38	38	82	67	77	75	20.30	.....

ROSEBURGH, OREGON.

[Latitude, 43° 13′ N.; longitude, 123° 20′ W.]

J..	29.620	29.95	29.04	41.2	45.9	43.0	43.4	58	23	49.2	37.6	38	39	39	39	89	79	86	85	8.64	2.45
F..	29.437	29.92	28.98	29.8	35.6	35.4	33.6	70	7	41.7	26.8	28	28	29	29	94	76	81	84	6.24	1.67
M.	29.589	29.90	29.21	42.4	53.4	53.1	49.6	81	29	61.9	39.6	39	40	41	40	88	63	66	72	2.38	0.89
A..	29.540	29.90	28.99	43.6	54.8	52.5	50.3	77	28	60.8	41.0	40	38	38	39	87	56	60	68	3.79	1.05
M.	29.493	29.85	29.20	47.5	62.3	61.9	57.2	102	32	70.2	45.4	43	44	44	44	86	54	55	65	1.53	0.33
J..	29.464	29.69	29.20	48.4	66.5	65.6	60.2	97	39	73.3	45.7	45	42	44	44	87	44	49	60	0.89	0.33
J..	29.509	29.70	29.30	52.2	71.4	74.6	66.1	93	40	81.6	49.0	48	50	50	50	87	49	44	60	0.07	0.07
A..	29.430	29.64	29.25	53.8	69.4	70.9	64.7	89	45	78.5	51.3	50	52	52	52	88	56	53	66	0.08	0.07
S..	29.466	29.77	29.23	49.4	67.7	67.4	61.5	95	36	77.2	45.1	44	46	46	46	83	49	49	60	0.51	0.19
O..	29.613	29.86	29.30	44.7	59.7	56.8	53.7	82	27	68.4	40.4	42	45	45	44	90	59	65	71	1.13	0.61
N..	29.540	29.82	29.20	40.9	48.9	46.7	45.5	69	20	54.5	36.4	38	41	41	40	91	77	81	83	3.19	1.30
D..	29.557	30.02	28.70	41.1	44.8	43.3	43.1	58	26	48.7	35.7	38	38	38	38	89	80	84	84	8.89	1.57
Y..	29.521	30.02	28.70	44.6	56.7	55.9	52.4	102	7	63.8	41.2	41	42	42	42	88	62	64	72	37.34	.....

SACRAMENTO, CAL.

[Latitude, 38° 35′ N.; longitude, 121° 30′ W.]

J..	30.111	30.46	29.64	42.7	51.4	51.3	48.5	65	30	57.7	39.3	39	40	41	40	86	66	68	73	1.12	0.90
F..	29.971	30.41	29.50	40.7	47.0	46.4	44.7	67	30	52.2	37.4	37	37	38	37	87	69	74	77	6.28	2.48
M.	30.048	30.27	29.83	49.5	62.1	61.9	57.8	79	41	69.4	46.9	44	46	49	46	83	56	64	68	0.94	0.65
A..	29.938	30.21	29.65	50.6	62.6	61.6	58.3	84	41	69.5	48.9	45	44	48	46	81	52	63	66	2.53	1.47
M.	29.906	30.20	29.66	52.2	69.5	66.9	62.9	98	39	75.9	50.5	47	48	51	49	82	48	58	63	T.	T.
J..	29.766	29.99	29.50	57.1	76.8	73.4	69.1	100	47	84.4	55.1	51	53	54	53	82	44	52	59	0.00	0.00
J..	29.840	30.06	29.69	56.0	79.0	75.7	70.2	99	48	88.3	54.3	50	57	56	54	80	47	51	59	0.00	0.00
A..	29.750	29.91	29.58	56.2	77.9	73.2	69.1	100	48	86.6	53.6	50	56	55	54	80	47	54	61	T.	T.
S..	29.819	29.99	29.60	58.2	78.6	74.3	70.4	100	46	86.3	55.3	48	52	52	51	70	42	48	53	0.02	0.02
O..	29.910	30.16	29.69	54.8	74.9	69.7	66.5	92	42	81.2	51.6	41	43	44	43	62	34	41	46	0.00	0.00
N..	29.991	30.26	29.68	45.2	61.1	57.8	54.7	75	28	67.5	41.6	38	43	42	41	78	52	58	63	0.45	0.28
D..	30.085	30.30	29.45	41.5	50.9	48.4	46.9	65	29	55.6	37.6	37	41	41	40	86	71	76	78	2.09	0.88
Y..	29.928	30.46	29.45	50.4	66.0	63.4	59.9	100	28	72.9	47.7	44	47	47	46	80	52	59	64	13.43	.....

SAINT LOUIS, MO.

[Latitude, 38° 38′ N.; longitude, 90° 12′ W.]

J..	29.422	30.03	28.72	26.8	34.0	31.5	30.8	66	-10	41.2	20.5	18	21	20	20	73	63	65	67	0.65	0.32
F..	29.534	30.10	28.62	36.6	43.2	41.9	40.6	74	4	50.3	31.3	29	31	32	31	75	66	70	70	3.68	0.56
M.	29.459	29.82	29.00	40.0	50.9	46.6	45.8	79	23	55.2	37.1	29	32	32	31	67	52	60	60	3.54	2.05
A..	29.374	29.75	28.80	53.1	66.3	62.7	60.7	87	32	70.3	51.1	38	38	41	39	58	39	47	48	4.36	1.87
M.	29.370	29.69	28.99	66.0	76.7	71.4	71.4	89	51	78.8	63.4	57	56	58	57	74	50	63	62	5.27	1.55
J..	29.391	29.64	29.16	71.4	82.7	77.9	77.3	97	57	85.4	68.8	61	59	62	61	70	47	60	59	2.54	0.70
J.	29.380	29.51	29.23	77.4	89.4	84.3	83.7	100	68	92.1	75.4	66	65	67	66	68	46	58	57	2.74	1.07
A..	29.360	29.56	29.20	72.5	85.5	79.5	79.2	99	52	87.5	70.6	59	58	60	59	63	41	53	52	1.14	0.58
S..	29.451	29.74	29.09	63.2	76.2	70.5	70.0	97	45	79.0	61.1	55	53	54	54	76	48	59	61	2.47	0.89
O.	29.496	29.92	29.06	46.8	61.6	54.7	54.4	86	24	65.2	43.3	38	36	37	37	72	41	54	56	0.76	0.58
N.	29.484	30.01	28.94	38.5	50.9	45.0	44.8	79	10	56.0	34.6	26	25	28	27	65	43	55	54	4.61	2.32
D.	29.465	30.08	28.84	28.2	34.5	31.9	31.5	58	-2	39.9	23.7	24	25	25	25	84	71	77	77	3.54	1.49
Y.	29.435	30.10	28.62	51.7	62.7	58.2	57.5	100	-10	66.7	48.4	42	42	43	42	70	51	60	60	35.80	.....

Monthly and yearly meteorological summaries—Continued.

ROCHESTER, N. Y.

(H=621. T=156. h=145.)

Cloudiness (in tenths).				Wind.													Number of days—										
7 a. m.	3 p. m.	10 p. m.	Mean.	Total (miles).	Maximum.	Direction.	Prevailing direction.	North.	Northeast.	East.	Southeast.	South.	Southwest.	West.	Northwest.	Calms.	Clear.	Fair.	Cloudy.	Foggy.	Rain or snow.	Max. below 32°.	Min. below 32°.	Max. above 90°.	Thunder-storms.	Auroras.	Months and year.
9.3	9.0	8.1	8.8	10,626	52	W.	W.	1	2	5	11	12	25	26	11	0	0	5	26	0	23	19	30	0	0	0	J.
8.9	8.5	8.5	8.6	9,535	54	S.	W.	3	4	13	10	7	8	23	16	0	0	5	23	0	23	10	28	0	0	1	F.
7.9	7.9	6.7	7.5	10,056	40	W.	NW.	6	5	5	9	7	7	18	36	0	4	7	20	0	17	14	30	0	0	0	M.
5.2	7.2	4.6	5.7	9,577	40	W.	W.	5	11	10	5	9	17	20	13	0	4	19	7	0	9	0	12	0	2	0	A.
5.1	6.0	4.0	5.0	6,085	27	SE.	SW.	8	15	7	22	4	23	6	8	0	8	14	9	0	7	0	0	0	4	0	M.
6.4	6.1	4.0	5.5	5,406	27	W.	SW.	14	12	7	11	5	21	10	10	0	6	16	8	0	11	0	0	0	3	0	J.
4.4	4.1	2.5	3.7	6,634	36	SW.	SW.	19	9	1	6	12	23	10	13	0	14	14	3	0	7	0	0	5	3	0	J.
4.9	3.9	2.1	3.6	6,160	25	S.	SW.	14	13	5	6	7	24	9	15	0	15	12	4	0	9	0	0	0	1	0	A.
6.3	4.9	4.2	5.1	6,991	36	NW.	SW.	13	6	4	7	6	28	7	19	0	10	9	11	0	12	0	0	0	2	0	S.
7.1	6.1	4.4	5.9	8,350	56	SW.	SW.	6	3	1	6	8	31	22	16	0	7	12	12	0	16	1	9	0	1	0	O.
6.8	6.9	5.9	6.5	9,439	36	SW.	SW.	2	7	4	10	9	27	15	16	0	5	11	14	0	11	2	18	0	0	0	N.
7.6	7.8	6.7	7.4	8,313	48	W.	W.	2	3	8	18	11	15	20	16	0	4	7	20	0	16	11	27	0	0	0	D.
6.7	6.5	5.1	6.1	97,172	..	.....	SW.	93	90	70	121	97	249	186	189	0	77	131	157	0	161	57	154	5	16	1	Y.

ROSEBURGH, OREGON.

[H=523. T=54. h=46.]

7.5	8.5	7.7	7.9	3,080	24	S.	S.	2	13	10	5	25	14	10	8	6	2	9	20	0	25	0	5	0	0	0	J.
6.5	7.3	7.1	7.0	2,255	18	W.	W.	7	5	6	5	9	14	17	13	8	1	18	9	0	19	3	22	0	0	0	F.
6.2	6.6	6.4	6.4	2,726	33	S.	NW.	5	10	5	2	16	15	14	19	7	5	12	14	0	12	0	2	0	0	0	M.
7.1	6.7	5.7	6.5	3,256	26	SW.	W.	9	6	2	3	13	11	19	16	11	3	16	11	0	14	0	2	0	0	0	A.
5.8	4.6	4.3	4.9	3,444	21	S.	NW.	10	7	4	1	10	11	15	24	11	8	15	8	0	13	0	1	2	1	0	M.
4.2	4.6	3.4	4.1	3,363	16	NW., N.	N.	29	8	2	0	3	5	5	26	12	14	10	6	0	7	0	0	2	0	0	J.
1.6	1.3	0.8	1.2	3,006	18	NW.	NW.	20	8	2	0	0	3	5	43	12	25	6	0	0	1	0	0	3	0	0	J.
2.7	1.8	0.4	1.6	3,144	22	NW.	NW.	16	8	0	0	0	3	14	36	16	23	8	0	0	2	0	0	0	1	0	A.
2.3	3.7	2.7	2.9	2,285	24	N., S.	W.	14	7	4	0	2	6	20	16	21	18	7	5	0	6	0	0	2	1	0	S.
3.9	3.4	1.9	3.1	1,900	20	SW.	W.	7	6	3	3	3	4	25	15	27	17	11	3	0	5	0	2	0	0	0	O.
6.5	6.9	4.8	6.1	1,525	24	SE.	W.	6	9	5	2	6	5	23	6	28	6	14	10	0	9	0	9	0	0	0	N.
7.7	8.8	7.1	7.9	2,783	30	SW.	S.	9	11	4	6	20	13	8	0	22	0	12	19	0	22	0	5	0	0	0	D.
5.2	5.4	4.4	5.0	33,367	..	.....	NW.	134	98	47	27	107	104	175	222	181	122	138	105	0	135	3	48	9	3	0	Y.

SACRAMENTO, CAL.

[H=64. T=61. h=57.]

2.3	2.8	1.7	2.3	4,411	26	NW.	NW.	10	2	9	20	9	5	3	24	11	21	7	3	0	6	0	3	0	0	0	J.
5.0	6.4	4.6	5.3	6,305	33	NW.	S.	9	0	7	16	22	4	2	21	3	8	11	9	0	14	0	1	0	0	0	F.
1.8	2.3	2.8	2.3	4,469	24	NW.	NW.	6	1	4	19	13	18	0	28	4	21	8	2	0	5	0	0	0	0	0	M.
2.4	3.6	2.7	2.9	6,320	30	NW., SE.	NW.	0	2	0	12	15	16	3	36	5	19	7	3	0	7	0	0	0	0	0	A.
2.1	2.4	1.8	2.1	6,422	29	NW.	SW.	1	0	0	18	24	20	3	17	1	21	9	1	0	0	0	0	3	0	0	M.
1.1	1.4	0.6	1.0	5,791	30	SW.	SW.	0	1	0	19	19	27	1	20	3	24	6	0	0	0	0	0	8	0	0	J.
0.2	0.3	0.5	0.3	5,589	24	S., SW.	S.	0	0	0	23	35	31	1	3	0	31	0	0	0	0	0	0	13	0	0	J.
0.0	0.0	0.3	0.1	5,085	24	S.	S.	0	1	0	21	35	20	0	13	3	31	0	0	0	0	0	0	10	0	0	A.
0.8	1.7	1.4	1.3	4,052	24	NW., SW.	NW.	1	1	0	20	20	19	0	25	4	23	7	0	0	1	0	0	10	1	0	S.
0.0	1.2	0.4	0.5	4,624	33	NW.	NW.	10	0	0	17	12	10	0	41	3	28	3	0	0	0	0	0	4	0	0	O.
1.3	2.3	1.8	1.8	3,190	27	NW.	NW.	11	5	1	19	15	8	1	21	8	23	3	3	0	3	0	2	0	1	0	N.
4.0	4.4	2.2	3.5	6,064	40	SE.	SE.	21	0	3	29	18	6	0	10	6	15	13	3	0	8	0	3	0	0	0	D.
1.8	2.4	1.7	2.0	61,322	..	.....	NW.	69	13	24	233	237	193	14	259	51	265	74	24	0	44	0	9	48	2	0	Y.

SAINT LOUIS, MO.

[H=571. T=107. h=99.]

4.0	5.3	3.6	4.3	9,61140		W.	S.	9	10	2	0	25	15	15	17	0	12	13	6	0	7	10	20	0	0	0	J.
7.3	6.4	5.9	6.5	7,61145		NW.	S.	11	7	8	11	18	5	11	10	3	5	9	14	0	13	3	12	0	3	0	F.
4.9	5.4	3.5	4.6	7,17638		W.	N.	18	15	13	6	10	11	6	14	0	13	10	8	0	9	0	7	0	1	0	M.
5.1	4.9	2.5	4.2	9,65340		SW., NW.	S.	8	2	4	5	27	17	15	11	1	11	15	4	0	10	0	1	0	3	0	A.
5.5	5.5	3.5	4.8	4,67428		N., SW.	S.	16	13	8	8	18	9	12	7	2	10	12	9	0	15	0	0	0	10	0	M.
3.8	4.4	3.0	3.7	4,86424		S., N.	S.	1	4	13	14	19	17	11	10	1	13	12	5	0	8	0	0	7	4	0	J.
2.5	4.2	1.8	2.8	4,48820		S., SW.	S.	12	10	2	11	26	12	7	11	2	18	10	3	0	8	0	0	20	3	0	J.
4.2	4.6	2.7	3.8	4,89822		SW.	N.	18	11	5	17	11	11	4	14	2	14	11	6	0	8	0	0	13	2	0	A.
5.3	6.2	2.8	4.8	5,55424		NW.	S.	14	15	9	13	24	9	3	3	0	11	13	6	0	8	0	0	5	0	0	S.
3.1	3.8	2.5	3.1	8,31654		S.	N.	18	6	2	12	17	10	10	16	2	17	10	4	0	5	0	2	0	0	0	O.
3.0	3.0	2.5	2.8	8,54054		SW.	S.	8	11	0	11	20	18	6	14	2	17	9	4	0	6	2	7	0	1	0	N.
5.5	7.0	6.4	6.3	8,90550		NW.	NW.	3	10	2	20	16	10	8	22	2	8	9	14	0	10	5	20	0	0	0	D.
4.5	5.1	3.4	4.3	84,290	..	.....	S.	136	114	68	128	231	144	108	149	17	149	133	83	0	107	20	69	45	27	0	Y.

Monthly and yearly meteorological summaries—Continued.

SAINT PAUL, MINN.

[Latitude, 44° 58′ N.; longitude, 93° 3′ W.]

Months and year.	Pressure.			Temperature.								Dew point.				Relative humidity.				Precipitation.	
	Mean.	Maximum.	Minimum.	7 a. m.	3 p. m.	10 p. m.	Mean.	Maximum.	Minimum.	Mean. Maximum.	Mean. Minimum.	7 a. m.	3 p. m.	10 p. m.	Mean.	7 a. m.	3 p. m.	10 p. m.	Mean.	Total.	Max. 24 hours.
	In.	In.	In.	°	°	°	°	°	°	°	°	°	°	°	°					In.	In.
J..	29.058	29.68	28.25	-4.6	5.4	2.3	1.0	32	-36	11.7	-10.3	-9	-2	-3	-5	82	72	79	78	1.79	1.05
F..	29.214	29.97	28.43	3.1	14.9	11.1	9.7	43	-27	21.0	-2.3	-1	9	6	5	82	78	80	80	0.89	0.61
M.	29.189	29.82	28.59	21.6	31.5	27.7	26.9	54	-7	35.3	18.4	17	21	22	20	82	67	78	76	0.33	0.19
A..	28.987	29.39	28.59	37.1	51.8	46.1	45.0	84	14	56.6	34.1	32	37	36	35	82	61	69	71	3.14	1.58
M.	29.025	29.44	28.30	55.7	71.9	64.8	64.1	91	37	76.3	51.8	49	51	50	50	79	49	60	63	1.60	0.68
J..	29.048	29.83	28.77	62.9	75.7	70.2	69.6	90	48	80.1	59.8	58	61	61	60	85	63	73	74	2.89	0.84
J..	29.054	29.25	28.80	65.7	82.2	74.4	74.1	94	51	85.0	63.0	61	63	65	63	86	54	72	71	3.89	1.16
A..	29.097	29.30	28.90	58.3	73.4	66.3	66.0	94	41	76.8	56.3	54	60	58	57	87	65	76	76	3.37	1.08
S..	29.165	29.53	28.65	51.4	64.6	57.5	57.8	83	34	67.3	49.5	48	53	52	51	87	67	82	79	4.35	2.35
O..	29.111	29.61	28.59	35.8	49.3	41.7	42.3	72	12	52.6	33.1	31	36	34	34	83	64	76	74	1.48	0.71
N..	29.133	29.78	28.43	26.2	37.4	30.1	31.2	70	-20	40.2	22.6	21	25	24	23	83	64	78	75	0.65	0.18
D..	29.095	29.81	28.41	13.8	20.2	17.3	17.1	41	-22	26.0	8.6	11	15	14	13	88	82	86	85	1.47	0.31
Y..	29.098	29.97	28.25	35.6	48.2	42.5	42.1	94	-36	52.4	32.0	31	36	35	34	84	66	76	75	25.85	.....

SAINT VINCENT, MINN.

[Latitude, 48° 56′ N.; longitude, 97° 14′ W.]

J..	29.106	29.78	28.37	-18.0	-7.5	-12.5	-12.7	23	-42	-2.6	-22.4	-22	-13	-16	-17	83	75	82	80	0.68	0.33
F..	29.286	30.01	28.68	-10.5	2.1	-3.8	-4.1	28	-38	4.6	-14.7	-14	-3	-7	-8	84	80	87	84	0.83	0.24
M.	29.252	29.94	28.47	9.0	22.2	17.0	16.1	45	-27	27.1	5.0	6	17	14	12	87	81	86	85	0.48	0.11
A..	29.057	29.43	28.50	30.7	46.1	37.2	38.0	84	-4	49.7	26.5	28	40	34	34	89	80	87	85	1.43	0.88
M.	29.012	29.66	28.43	49.9	66.6	56.5	57.7	96	25	71.8	44.2	46	57	51	51	86	74	82	80	3.57	1.26
J..	29.037	29.36	28.72	58.5	73.8	63.5	65.3	93	34	78.3	52.4	54	59	57	57	85	62	81	76	4.15	1.76
J..	29.091	29.34	28.86	59.6	73.9	65.0	66.2	89	38	78.3	54.9	56	62	61	60	89	68	86	81	4.28	1.91
A..	29.118	29.36	28.64	51.4	70.6	60.2	60.7	88	29	73.8	47.8	49	60	56	55	92	71	87	83	1.68	0.34
S..	29.130	29.56	28.44	44.7	66.3	53.4	54.8	85	18	68.5	39.6	42	52	48	47	90	62	81	78	0.45	0.23
O..	29.128	29.71	28.38	27.4	44.8	32.9	35.0	71	-10	47.1	20.7	22	31	25	26	83	59	74	72	0.16	0.08
N..	29.145	29.90	28.49	12.5	29.6	17.6	19.9	69	-30	32.5	5.4	9	20	12	14	87	68	81	79	0.22	0.10
D..	29.193	29.90	28.57	-1.1	7.4	1.1	2.5	43	-44	11.9	-9.0	-3	2	-2	-1	91	80	88	86	0.54	0.14
Y..	29.130	30.01	28.37	26.2	41.3	32.3	33.3	96	-44	45.1	20.9	23	32	28	28	87	72	84	81	18.47	....

SALT LAKE CITY, UTAH.

[Latitude, 40° 46′ N.; longitude, 111° 54′ W.]

J..	25.648	26.09	25.20	31.2	35.9	32.6	33.2	52	12	41.0	25.3	24	26	24	25	75	67	73	72	2.36	0.51
F..	25.549	26.11	25.07	30.9	57.5	33.7	34.0	53	13	42.0	26.2	24	24	24	24	75	59	70	68	1.41	0.47
M.	25.729	26.06	25.45	39.6	53.7	48.0	47.1	74	28	58.3	36.2	29	30	31	30	66	44	54	55	0.35	0.13
A..	25.579	25.88	25.20	42.3	53.9	49.4	48.6	81	27	59.9	38.4	32	35	34	34	67	52	57	59	1.87	0.61
M.	25.606	25.91	25.23	50.2	68.1	62.8	60.4	93	31	73.0	48.5	38	45	43	42	65	46	51	54	0.73	0.33
J..	25.533	25.81	25.16	58.8	77.0	70.3	68.7	97	44	81.8	55.4	44	50	48	47	60	39	47	49	0.37	0.22
J..	25.655	25.81	25.48	65.5	83.8	76.5	75.3	98	54	88.2	61.6	49	57	53	53	57	42	47	49	1.23	0.76
A..	25.568	25.75	25.34	66.0	81.5	74.6	74.0	95	46	86.1	60.6	44	50	46	47	46	36	39	40	0.69	0.34
S..	25.651	25.87	25.27	56.3	74.5	66.3	65.7	90	40	78.6	52.4	38	44	42	42	54	36	43	44	0.55	0.38
O..	25.722	26.04	25.20	45.3	60.2	51.9	52.5	85	28	63.1	40.0	27	32	30	30	50	36	44	44	0.30	0.30
N..	25.705	25.93	25.25	37.6	51.5	42.0	43.7	67	11	54.2	31.3	21	26	23	23	53	39	48	47	0.25	0.25
D..	25.697	26.03	25.11	26.1	33.5	29.4	29.7	50	9	36.8	21.5	19	20	19	19	74	60	68	67	1.55	0.58
Y..	25.637	26.11	25.07	45.8	59.3	53.1	52.7	98	9	63.6	41.4	32	37	35	35	62	46	53	54	11.66	.....

SAN ANTONIO, TEX.

[Latitude, 29° 27′ N.; longitude, 98° 28′ W.]

J..	29.298	29.80	28.95	40.9	58.9	50.9	50.2	81	17	63.4	37.9	32	32	34	33	72	42	57	57	0.21	0.11
F..	29.297	29.77	28.87	53.5	64.5	58.1	58.7	84	28	69.6	49.3	46	47	46	47	80	58	70	70	0.70	0.18
M.	29.231	29.59	28.94	55.6	73.7	65.6	65.0	93	39	78.0	53.2	48	45	47	47	78	40	55	58	0.51	0.21
A..	29.173	29.47	28.76	60.2	77.0	69.8	69.0	95	37	80.1	58.4	55	55	55	55	85	50	62	66	0.60	0.28
M.	29.137	29.35	28.82	66.2	82.2	74.8	74.4	97	47	86.8	63.6	63	61	62	62	91	52	66	70	2.61	0.68
J..	29.116	29.25	28.91	71.5	86.6	79.8	79.3	101	64	89.4	69.9	69	66	68	68	92	52	70	71	2.21	1.17
J..	29.199	29.37	29.07	74.2	92.8	84.5	83.8	101	68	95.9	73.3	72	68	70	70	92	45	62	66	0.70	0.30
A..	29.128	29.24	29.00	74.9	90.5	83.5	83.0	100	67	93.8	73.9	73	71	71	72	93	53	68	71	3.63	2.11
S..	29.194	29.30	28.88	70.5	84.2	77.7	77.5	94	50	87.0	69.5	68	66	67	67	90	56	70	72	1.77	0.65
O..	29.252	29.57	28.86	60.4	73.6	66.7	66.9	90	44	77.1	58.1	54	54	53	54	80	53	64	66	2.17	1.02
N..	29.300	29.67	29.07	51.7	66.6	60.2	59.5	80	28	70.2	49.4	44	49	48	48	79	57	68	68	2.44	1.49
D..	29.260	29.75	28.83	44.1	55.1	49.1	49.4	74	22	58.4	41.1	39	40	40	39	82	61	72	71	2.58	1.38
Y..	29.215	29.80	28.76	60.3	75.5	68.4	68.1	101	17	79.1	58.1	55	54	55	55	84	52	65	67	20.13	.....

Monthly and yearly meteorological summaries—Continued.

SAINT PAUL, MINN.

[H=831. T=114. h=108.]

Cloudiness (in tenths).				Wind.												Number of days—										
7 a. m.	3 p. m.	10 p. m.	Mean.	Total (miles).	Maximum.	Direction.	Prevailing direction.	North.	Northeast.	East.	Southeast.	South.	Southwest.	West.	Northwest.	Calms.	Clear.	Fair.	Cloudy.	Foggy.	Rain or snow.	Max. below 32°.	Min. below 32°.	Max. above 90°.	Thunder-storms.	Auroras.	Months and year.
3.9	5.9	4.4	4.7	3,999	23	NW., W.	NW.	2	3	8	15	4	8	19	20	14	9	15	7	0	8	31	31	0	0	0	J.
5.7	5.4	4.2	5.1	4,288	26	NW.	W.	3	6	13	7	4	5	17	14	15	7	16	5	0	10	25	28	0	0	0	F.
5.6	5.1	4.0	4.9	4,908	28	NW., W.	N. W.	7	3	12	15	3	4	14	25	10	11	11	9	0	4	11	31	0	0	0	M.
5.2	6.1	6.2	5.8	5,936	29	N., NW.	E., NW.	6	3	18	14	2	8	12	18	9	7	13	10	0	11	1	13	0	4	0	A.
4.0	4.2	4.0	4.1	5,863	36	S.	SE.	4	3	19	20	6	11	11	12	7	12	15	4	0	7	0	0	1	3	0	M.
4.6	5.9	4.6	5.0	3,910	38	W.	SE.	2	3	18	21	3	5	10	10	18	7	18	5	0	8	0	0	0	3	0	J.
5.5	5.4	4.6	5.2	2,256	30	W.	SW	5	3	9	9	6	12	8	11	30	7	19	5	0	10	0	0	6	5	1	J.
6.1	7.1	6.7	6.6	3,073	29	W.	NW.	0	6	15	10	3	2	10	19	28	3	15	13	0	14	0	0	2	5	0	A.
5.8	5.6	4.9	5.4	3,908	25	SE., W.	SE.	2	4	16	19	6	4	9	18	18	7	13	10	0	11	0	0	0	4	0	S.
5.2	4.9	5.5	5.2	4,382	35	NW.	W., NW.	4	2	11	15	4	7	18	18	14	9	14	8	0	7	1	13	0	2	0	O.
4.9	5.6	6.5	5.7	4,222	38	W.	NW.	4	3	16	12	2	6	12	17	18	8	12	10	0	8	9	22	0	0	0	N.
7.3	7.5	7.6	7.5	3,704	26	E.	W.	3	3	11	13	5	5	18	17	18	3	11	17	0	16	17	31	0	0	0	D.
5.3	5.7	5.3	5.4	50,449	..	.....	NW.	42	42	166	170	42	77	158	199	199	90	172	103	0	114	95	169	9	26	1	Y.

SAINT VINCENT, MINN.

[H=804. T=16. h=14.]

4.9	5.4	3.1	4.5	5,108	44	S.	S.	18	3	1	7	24	1	5	22	12	10	15	6	0	8	31	31	0	0	2	J.
4.2	5.7	3.9	4.6	4,428	32	NW.	NW.	13	1	2	7	18	3	6	22	12	8	17	3	0	7	28	28	0	0	1	F.
5.2	6.3	3.9	5.1	6,919	45	S.	NW.	17	1	3	6	24	1	3	31	7	11	11	9	0	8	17	30	0	0	1	M.
5.3	6.4	5.1	5.6	6,040	30	N., S.	N.	25	2	4	8	16	2	6	19	8	8	10	12	0	8	2	20	0	1	1	A.
4.5	5.8	3.9	4.7	7,305	38	NW.	NW.	11	2	1	14	17	10	7	28	3	10	14	7	0	10	0	1	2	4	2	M.
4.2	5.6	4.1	4.6	6,283	36	S.	S.	14	3	5	17	18	4	8	14	7	9	16	5	0	9	0	0	1	5	0	J.
4.5	5.7	3.6	4.6	3,880	36	N., NW.	N.	28	5	4	6	16	4	6	14	10	12	15	4	0	8	0	0	0	2	0	J.
4.3	5.7	4.9	5.0	3,627	30	N., S.	S.	18	4	1	19	20	1	0	9	21	8	15	8	0	8	0	1	0	0	2	A.
3.6	4.2	2.9	3.6	6,400	48	S.	S.	13	2	5	5	25	6	14	5	15	13	13	4	0	4	0	8	0	1	3	S.
5.5	5.5	3.8	4.9	6,523	42	NW.	N.	26	1	3	1	24	5	10	16	7	7	16	8	0	4	5	26	0	0	3	O.
3.7	4.8	4.5	4.3	6,123	37	N., NW.	S.	19	4	3	4	31	4	9	13	3	10	16	4	0	4	13	30	0	0	0	N.
4.9	5.6	4.5	5.0	7,360	38	N.	N.	33	3	8	0	22	2	4	14	7	9	15	7	0	9	29	31	0	0	4	D.
4.6	5.6	4.0	4.7	69,996	..	.....	S.	235	31	40	94	255	43	78	207	112	115	173	77	0	87	125	206	3	13	19	Y.

SALT LAKE CITY, UTAH.

[H=4,348. T=92. h=78.]

6.9	7.4	5.6	6.6	3,862	28	SW.	SE.	7	3	5	26	17	1	10	15	4	4	11	16	0	16	3	27	0	0	0	J.
6.3	6.8	5.9	6.3	5,350	33	S.	S.	5	7	2	21	23	0	6	17	3	7	8	13	0	13	4	20	0	0	0	F.
3.1	5.2	3.0	3.8	3,933	27	NW.	SE., NW.	13	8	6	18	14	4	6	18	6	16	12	3	0	7	0	10	0	1	0	M.
3.7	6.4	4.4	4.8	4,877	32	S.	NW.	10	7	7	15	13	2	9	25	2	10	13	7	0	8	0	5	0	0	0	A.
2.2	3.2	3.8	3.1	4,926	29	S.	NW.	10	6	6	22	10	1	4	28	5	14	13	3	0	3	0	1	1	1	0	M.
2.0	2.8	2.5	2.4	4,589	36	S.	N.	25	4	6	19	9	0	3	23	1	20	9	1	0	3	0	0	3	1	0	J.
2.6	3.2	3.5	3.1	3,800	45	SE.	N.	26	6	5	18	8	0	4	20	6	18	10	3	0	3	0	0	11	2	0	J.
2.7	3.9	3.1	3.2	4,521	36	S.	SE.	23	3	7	28	15	1	2	14	0	14	15	2	0	8	0	0	8	2	0	A.
1.9	2.1	1.7	1.9	3,723	32	NW.	NW.	10	14	10	11	17	1	3	18	6	21	8	1	0	4	0	0	0	2	0	S.
1.7	2.5	1.6	1.9	3,414	27	NW.	NW.	17	11	6	12	3	2	6	27	9	23	7	1	0	1	0	3	0	0	0	O.
2.8	4.0	2.4	3.1	2,863	23	N.	E.	4	11	17	14	8	5	8	16	7	15	12	3	0	1	1	13	0	0	0	N.
5.9	6.5	3.9	5.4	3,406	40	S.	SE., S.	5	8	14	19	19	4	7	11	6	8	14	9	0	13	8	29	0	1	0	D.
3.5	4.5	3.4	3.8	49,267	..	.....	NW.	155	93	91	223	156	21	63	232	55	170	132	62	0	80	16	108	23	10	0	Y.

SAN ANTONIO, TEX.

[H=781. T=17. h=2.]

3.9	3.3	1.9	3.0	7,158	33	N.	N.	31	7	4	6	24	11	3	6	1	14	14	3	0	4	0	11	0	0	0	J.
7.5	7.8	4.7	6.7	6,702	36	NE.	N.	21	19	6	16	17	2	0	2	1	1	18	9	0	8	0	2	0	1	0	F.
5.3	4.6	2.5	4.1	6,818	27	NE.	S.	24	12	3	19	26	4	4	1	0	11	14	6	0	5	0	0	1	1	0	M.
7.3	5.6	4.1	5.7	7,886	36	W.	SE.	7	11	4	43	20	0	5	0	0	8	10	12	0	5	0	0	3	0	0	A.
6.4	5.4	3.5	5.1	7,031	34	NE.	SE.	13	13	12	29	19	2	4	1	0	8	15	8	0	9	0	0	9	6	0	M.
4.4	4.0	2.2	3.5	6,054	28	SE.	SE.	6	17	6	43	13	0	2	0	3	14	12	4	0	7	0	0	13	3	0	J.
5.2	4.1	2.1	3.8	6,401	40	SE.	SE.	2	5	2	47	33	4	0	0	0	8	22	1	0	5	0	0	30	8	0	J.
8.1	6.6	3.2	6.0	5,874	30	NE.	SE.	4	8	8	41	27	4	1	0	0	2	20	9	0	8	0	0	25	4	0	A.
5.7	6.5	3.6	5.3	5,953	28	SE.	SE.	12	23	15	27	8	2	2	1	0	9	11	10	0	6	0	0	13	1	0	S.
6.1	4.8	3.6	4.8	6,491	35	NE.	NE.	22	28	3	20	12	2	1	3	2	11	11	9	0	7	0	0	0	0	0	O.
5.5	6.1	4.3	5.3	5,028	36	N.	NE.	18	20	7	9	14	10	8	1	3	11	7	12	0	7	0	1	0	1	0	N.
6.0	6.6	4.5	5.7	6,716	32	NE.	N.	32	27	3	7	12	5	4	2	1	10	8	13	0	14	2	8	0	0	0	D.
6.0	5.4	3.4	4.9	78,112	..	.....	SE.	192	190	73	307	225	46	34	17	11	107	162	96	0	85	2	22	94	25	0	Y.

Monthly and yearly meteorological summaries—Continued.

SAN DIEGO, CAL.

[Latitude, 32° 43′ N.; longitude, 117° 10′ W.]

Months and year.	Pressure.			Temperature.								Dew point.				Relative humidity.				Precipitation.	
	Mean.	Maximum.	Minimum.	7 a. m.	3 p. m.	10 p. m.	Mean.	Maximum.	Minimum.	Mean. Maximum.	Mean. Minimum.	7 a. m.	3 p. m.	10 p. m.	Mean.	7 a. m.	3 p. m.	10 p. m.	Mean.	Total.	Max. 24 hours.
	In.	In.	In.	°	°	°	°	°	°	°	°	°	°	°	°					In.	In.
J..	30.025	30.23	29.84	47.5	60.9	54.6	54.3	74	38	62.6	44.8	39	44	47	43	74	57	78	70	.04	.04
F..	30.023	30.23	29.71	47.1	57.7	53.9	52.9	76	38	59.9	45.4	42	44	46	44	84	64	77	75	4.51	1.96
M.	30.018	30.15	29.87	51.7	62.4	57.5	57.2	82	44	65.3	49.5	47	50	52	50	86	68	83	79	.02	.02
A..	29.951	30.12	29.82	54.5	63.3	59.1	59.0	80	44	65.4	52.9	50	52	51	51	85	67	75	76	2.14	.94
M.	29.919	30.10	29.81	57.6	66.3	62.3	62.1	79	48	68.2	56.2	52	54	54	53	81	65	76	74	.47	.44
J..	29.823	29.97	29.69	60.5	68.5	64.9	64.6	78	54	70.1	59.5	57	59	59	58	89	72	80	80	.04	.04
J..	29.908	30.03	29.81	63.4	69.6	66.5	66.5	79	60	71.6	62.3	60	61	60	60	88	74	82	81	.01	.01
A..	29.820	29.94	29.72	63.5	69.6	65.4	66.2	77	54	70.9	62.1	59	59	60	59	86	70	82	80	T.	T.
S..	29.839	29.94	29.72	62.6	69.5	65.0	65.7	79	58	70.9	61.4	60	61	61	60	90	74	87	84	T.	T.
O..	29.874	30.07	29.53	59.3	69.6	64.6	64.5	85	50	71.9	57.7	52	56	54	54	78	65	74	72	T.	T.
N..	29.959	30.14	29.69	53.8	64.4	59.3	59.2	82	44	66.4	51.5	48	53	52	51	82	69	80	77	2.08	1.80
D..	30.038	30.20	29.84	48.9	60.5	54.5	54.6	74	36	62.2	46.7	41	44	47	44	76	59	77	71	1.14	.74
Y..	29.933	30.23	29.53	55.9	65.2	60.6	60.6	85	36	67.1	54.2	30	53	54	52	83	67	79	76	10.45	.....

SANDUSKY, OHIO.

[Latitude, 41° 25′ N.; longitude, 82° 40′ W.]

J..	29.391	29.86	28.72	29.9	26.7	22.6	26.4	62	-8	31.7	14.5	16	20	18	18	82	76	83	80	1.51	.30
F..	29.459	30.14	28.62	28.0	33.2	30.3	30.5	60	8	38.4	23.4	24	28	27	26	85	80	88	84	8.53	2.98
M.	29.365	29.97	28.67	29.3	34.3	31.1	31.6	62	11	38.4	25.5	23	26	26	25	78	71	80	77	2.16	1.15
A..	29.312	29.80	28.66	41.4	49.4	44.9	45.2	81	19	54.5	36.7	33	33	34	33	74	58	68	66	2.10	.70
M.	29.341	29.62	28.99	58.3	64.6	60.5	61.1	91	47	70.1	54.3	51	53	54	52	77	68	78	74	1.61	.40
J..	29.334	29.71	29.01	65.9	73.5	68.2	69.2	91	49	77.8	61.4	59	60	60	60	80	64	75	73	4.44	1.22
J.	29.312	29.49	29.02	73.5	82.4	76.9	77.6	98	63	86.5	69.4	65	67	67	66	75	62	72	69	.59	.43
A..	29.347	29.63	29.10	66.3	75.0	70.6	70.6	97	50	79.0	62.8	57	60	58	58	73	60	66	66	1.57	.75
S..	29.436	29.73	29.04	58.3	67.5	62.5	62.8	95	42	71.7	55.2	52	54	54	53	80	64	74	72	2.31	1.38
O..	29.379	29.78	28.93	44.7	54.5	49.8	49.7	85	24	59.2	41.3	37	39	39	38	74	59	67	66	.83	.49
N..	29.378	30.14	28.66	35.9	43.8	39.6	39.8	69	4	49.4	30.9	29	32	30	30	76	66	72	71	2.25	.66
D..	29.396	30.12	28.91	27.3	33.5	30.6	30.5	58	1	37.1	23.2	23	25	25	24	84	72	80	79	1.90	.63
Y..	29.364	30.14	28.62	45.8	53.2	49.0	49.3	98	-8	57.8	41.6	39	41	41	40	78	66	75	73	29.85	.....

SANFORD, FLA.

[Latitude, 28° 48′ N.; longitude, 81° 23′ W.]

J..	30.134	30.46	29.76	50.0	63.8	54.0	55.9	80	32	66.0	45.9	45	48	47	47	85	60	78	74	1.32	.30
F..	30.196	30.46	29.88	62.1	75.8	65.8	67.9	85	44	77.7	60.6	60	58	61	60	94	58	87	79	1.10	.30
M.	30.032	30.42	29.66	54.8	71.6	60.4	62.3	83	39	73.6	52.7	50	50	52	51	85	50	76	70	2.22	.87
A..	30.039	30.28	29.72	64.8	77.3	66.5	69.5	90	44	79.5	60.9	60	58	60	60	84	54	82	74	3.19	1.17
M.	29.981	30.22	29.80	70.3	80.3	71.1	73.9	91	54	83.8	65.1	66	62	65	65	87	56	82	75	3.22	1.26
J..	29.970	30.11	29.79	75.2	83.1	74.5	77.6	95	64	87.3	70.0	71	68	70	70	87	64	85	79	6.12	2.01
J..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
A..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
S..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
O..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
N..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
D..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Y..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

SAN FRANCISCO, CAL.

[Latitude, 37° 48′ N.; longitude, 122° 26′ W.]

J..	30.135	30.50	29.73	48.7	54.4	52.4	51.8	73	42	58.7	46.4	44	43	43	43	84	67	72	74	1.90	.80
F..	29.989	30.37	29.53	43.9	49.4	47.8	47.0	67	33	53.4	42.2	40	39	39	39	85	70	72	76	9.24	3.00
M.	30.088	30.28	29.87	49.1	59.7	54.0	54.3	78	45	64.0	47.7	45	46	46	46	87	63	75	75	.84	.52
A..	29.992	30.25	29.70	49.9	60.4	53.1	54.5	78	44	63.1	48.6	44	45	44	45	82	59	74	72	2.30	1.45
M.	29.980	30.25	29.76	51.4	61.7	54.2	55.8	97	46	64.5	49.6	46	48	47	47	84	64	79	75	.06	.03
J..	29.854	30.03	29.57	53.1	64.8	56.2	58.0	90	48	67.1	51.7	49	51	50	50	86	62	79	76	.07	.07
J..	29.941	30.14	29.82	51.6	60.3	53.8	55.2	70	49	62.4	50.7	49	51	50	50	92	72	86	83	T.	T.
A..	29.837	29.98	29.71	52.5	61.8	54.7	56.3	74	49	64.6	51.1	50	51	50	50	91	69	86	82	.01	.01
S..	29.877	30.05	29.67	54.9	67.2	59.0	60.4	89	50	70.6	53.4	51	52	51	52	88	61	76	75	.29	.18
O..	29.940	30.16	29.74	56.9	69.9	61.9	62.9	87	49	73.8	54.7	49	49	48	49	79	52	64	65	T.	T.
N..	30.010	30.24	29.72	51.4	59.0	55.2	55.2	74	42	63.2	49.7	48	47	48	48	89	67	76	78	.99	.48
D..	30.096	30.32	29.47	48.7	54.3	52.1	51.7	69	40	58.0	46.3	44	43	42	43	84	70	72	75	3.34	1.14
Y..	29.978	30.50	29.47	51.0	60.2	54.5	55.2	97	33	63.6	49.3	47	47	46	47	86	64	76	75	19.04	....

Monthly and yearly meteorological summaries—Continued

SAN DIEGO, CAL.

[$H = 63.$ $T = 23.$ $h = 42.$]

Cloudiness (in tenths).				Wind.													Number of days—										
7 a. m.	3 p. m.	10 p. m.	Mean.	Total (miles).	Maximum.	Direction.	Prevailing direction.	North.	Northeast.	East.	Southeast.	South.	Southwest.	West.	Northwest.	Calms.	Clear.	Fair.	Cloudy.	Foggy.	Rain or snow.	Max. below 32°.	Min. below 32°.	Max. above 90°.	Thunder-storms.	Auroras.	Months and year.
1.6	3.6	2.2	2.5	3,508	17	SW., NW.	NW.	13	18	16	3	3	8	12	18	7	19	11	1	0	1	0	0	0	..	..	J.
3.5	5.2	2.4	3.7	4,954	35	S.	N., NW	17	6	1	3	9	12	13	17	6	14	10	4	0	12	0	0	0	..	..	F.
4.0	2.6	3.4	3.3	4,250	24	NE.	NW.	13	12	4	0	3	8	13	26	14	14	13	4	0	1	0	0	0	..	..	M.
6.2	4.8	5.3	5.4	5,092	30	W.	NW.	4	6	7	1	7	18	20	23	4	5	15	10	0	8	0	0	0	..	..	A.
6.7	4.0	5.3	5.3	5,026	20	NW.	W.	7	6	2	2	2	15	30	21	8	9	11	11	0	3	0	0	0	..	..	M.
7.6	2.1	4.0	4.6	5,321	20	NW.	NW.	15	0	2	1	7	17	19	26	3	8	17	5	0	1	0	0	0	..	..	J.
8.7	3.2	4.2	5.4	4,884	20	NW., N	SW.	14	1	0	0	0	26	23	22	7	3	20	8	0	1	0	0	0	..	..	J.
8.7	.8	2.9	4.1	4,528	21	NW.	NW.	18	0	0	0	1	14	22	29	9	3	25	3	0	0	0	0	0	..	..	A.
6.9	1.9	5.1	4.6	4,479	24	SW.	NW.	17	1	0	0	1	11	18	34	8	5	23	2	0	0	0	0	0	..	..	S.
5.9	2.4	2.3	3.5	4,020	20	NW.	NW.	17	9	6	1	3	16	10	23	8	12	15	4	0	0	0	0	0	..	..	O.
3.7	3.3	3.5	3.5	3,296	18	NW., N	NW.	16	16	1	0	6	6	6	27	12	15	8	7	0	4	0	0	0	..	..	N.
2.3	3.9	2.2	2.8	4,239	36	NW.	NE., E.	9	18	18	5	5	5	9	16	8	21	5	5	0	4	0	0	0	..	..	D.
5.5	3.2	3.6	4.1	53,597	...	.....	NW.	160	88	57	16	47	156	195	282	94	128	173	64	0	35	0	0	0	..	..	Y.

SANDUSKY, OHIO.

[$H = 638.$ $T = 74.$ $h = 68.$]

7.2	7.4	6.8	7.1	11,911	40	SW.	SW.	6	2	6	2	7	38	24	8	0	4	11	16	0	17	15	27	0	0	0	J.
8.0	8.0	6.9	7.6	9,883	48	NW., SW.	NW.	5	12	10	5	9	14	12	16	1	1	12	15	0	20	9	23	0	2	1	F.
5.8	6.3	6.2	6.1	10,606	50	NW.	NW.	14	15	11	2	4	6	5	34	2	8	10	15	0	10	7	27	0	1	0	M.
5.0	6.0	3.5	4.8	10,469	52	NE.	E.	6	8	19	4	6	18	14	13	2	7	19	4	0	11	0	7	0	1	0	A.
3.3	4.6	4.4	4.1	7,147	31	NW.	E.	14	13	23	11	7	11	4	5	2	14	16	7	0	10	0	0	1	2	0	M.
5.1	5.2	3.0	4.4	6,892	41	W.	E.	7	12	18	9	16	13	13	2	0	10	17	3	0	11	0	0	1	5	0	J.
3.6	4.1	2.1	3.3	6,943	42	NW.	NE.	12	21	9	5	16	14	11	4	1	13	15	3	0	4	0	0	8	4	0	J.
5.4	4.1	3.8	4.4	6,526	36	NE.	NE.	18	21	9	11	12	9	4	6	3	11	12	8	0	10	0	0	4	1	0	A.
5.7	6.0	4.6	5.4	7,660	43	N.	NE.	13	18	10	12	12	10	4	8	3	10	12	8	0	12	0	0	1	2	0	S.
5.6	5.7	5.2	5.8	9,272	46	SW.	SW.	8	2	0	1	21	29	14	17	1	9	9	13	0	9	0	4	0	0	0	O.
5.5	5.1	4.1	4.9	9,574	48	NW.	SW.	2	8	7	0	20	32	13	7	1	10	13	7	1	10	5	11	0	0	0	N.
7.5	6.0	6.4	6.9	7,827	42	W.	SW.	2	3	7	8	13	29	15	9	7	3	15	13	0	9	9	23	0	0	0	D.
5.7	5.8	4.8	5.4	104,710	...	.....	SW.	107	135	129	70	143	223	133	152	23	100	155	110	1	133	45	122	15	18	1	Y.

SANFORD, FLA.

[$H = 25.$ $T = 46.$ $h = 36.$]

4.5	4.9	3.4	4.3	5,382	28	NW.	S.	18	8	1	7	22	7	6	17	7	14	9	8	0	9	0	1	0	1	0	J.
3.6	4.9	2.2	3.6	4,135	21	NW.	S.	18	3	13	10	20	5	4	4	7	14	10	4	0	7	0	0	0	0	0	F.
2.3	4.0	1.8	2.7	4,787	25	SW.	SW.	13	12	1	6	12	17	14	12	6	19	9	3	0	8	0	0	0	1	0	M.
2.7	4.7	3.4	3.6	5,782	34	N.	E.	12	14	17	6	12	11	12	5	1	15	10	5	0	11	0	0	0	3	0	A.
4.1	6.1	2.9	4.4	4,763	27	NE.	W.	10	10	13	14	15	7	16	3	5	8	21	2	0	11	0	0	1	5	0	M.
4.6	6.7	4.1	5.1	4,300	26	S.	E.	9	14	22	9	20	9	3	0	4	8	15	7	0	18	0	0	9	8	0	J.
...	...	...	...	.....	...	.....	.....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	..	J.
...	...	...	...	.....	...	.....	.....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	..	A
...	...	...	...	.....	...	.....	.....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	..	S.
...	...	...	...	.....	...	.....	.....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	..	O.
...	...	...	...	.....	...	.....	.....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	..	N.
...	...	...	...	.....	...	.....	.....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	..	D.
...	...	...	...	.....	...	.....	.....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	..	Y.

SAN FRANCISCO, CAL.

[$H = 60.$ $T = 70.$ $h = 69.$]

3.7	3.3	2.3	3.1	4,701	32	SW.	NW.	26	8	2	5	4	8	8	27	5	18	8	5	0	7	0	0	0	0	0	J.
5.2	6.1	4.4	5.2	5,725	28	W.	NW.	10	12	3	13	15	5	8	17	1	9	10	9	0	15	0	0	0	0	0	F.
4.0	3.5	3.9	3.8	5,887	28	W.	W.	10	3	2	4	6	15	39	6	8	12	13	6	0	4	0	0	0	0	0	M
4.3	4.2	3.7	4.1	7,235	32	NW.	W.	3	0	1	3	2	21	47	10	3	13	10	7	0	8	0	0	0	0	0	A.
5.0	4.9	4.4	4.8	8,233	32	W.	W.	2	2	1	1	4	25	51	6	1	10	13	8	0	3	0	0	1	1	0	M.
4.1	2.3	3.3	3.2	9,102	36	W.	W.	1	1	0	0	2	20	61	4	1	13	15	2	0	1	0	0	0	0	0	J.
7.9	3.0	5.6	5.5	9,708	35	W.	W.	0	0	0	0	0	43	50	0	0	5	17	9	0	0	0	0	0	0	0	J.
6.9	3.2	4.0	4.7	8,545	36	W.	W.	0	0	0	0	2	45	46	0	0	9	13	9	0	0	0	0	0	0	0	A.
3.4	1.7	2.9	2.7	6,187	35	W.	W.	2	1	0	1	1	17	58	5	5	17	11	2	0	5	0	0	0	0	0	S.
2.5	1.7	1.5	1.9	5,744	34	W., N.	W.	8	4	5	1	3	9	31	25	7	21	8	2	0	0	0	0	0	0	0	O.
5.4	3.9	2.8	4.0	4,223	25	NW.	W.	12	5	4	6	7	14	22	14	6	13	9	8	0	5	0	0	0	0	0	N.
5.0	5.4	2.2	4.2	5,167	35	SW.	N., NW	18	11	1	17	10	4	10	18	4	12	13	6	0	12	0	0	0	0	0	D.
4.8	3.6	3.4	3.9	80,457	...	.....	W.	92	47	19	51	56	226	431	132	41	152	140	73	0	60	0	0	1	1	0	Y.

Monthly and yearly meteorological summaries—Continued.

SANTA FÉ, NEW MEXICO.

[Latitude, 35° 41′ N.; longitude, 105° 57′ W.]

Months and year.	Pressure.			Temperature.								Dew point.				Relative humidity.				Precipitation.	
										Mean.											
	Mean.	Maximum.	Minimum.	7 a. m.	3 p. m.	10 p. m.	Mean.	Maximum.	Minimum.	Maximum.	Minimum.	7 a. m.	3 p. m.	10 p. m.	Mean.	7 a. m.	3 p. m.	10 p. m.	Mean.	Total.	Max. 24 hours.
	In.	In.	In.	°	°	°	°	°	°	°	°	°	°	°	°					In.	In.
J	23.188	23.56	22.91	22.7	36.5	30.4	29.9	56	6	40.9	19.0	11	16	16	14	61	45	54	53	0.10	0.06
F	23.200	23.56	22.89	26.9	40.5	34.4	33.9	62	9	45.0	23.1	18	20	19	19	69	48	56	58	0.85	0.61
M	23.291	23.52	23.01	33.4	52.4	43.3	43.0	67	20	57.7	30.2	19	16	18	18	57	28	39	41	0.66	0.34
A	23.204	23.43	22.96	38.6	54.7	47.0	46.8	72	23	59.6	33.9	20	20	21	20	49	31	38	40	0.74	0.49
M	23.294	23.51	22.98	46.8	63.5	55.7	55.3	81	24	67.5	42.5	29	25	28	27	53	28	39	40	1.72	0.65
J	23.298	23.51	23.16	56.8	73.8	66.1	65.6	86	48	78.3	55.5	41	37	40	39	58	30	40	43	0.60	0.22
J	23.408	23.53	23.27	58.4	75.0	67.5	67.0	87	51	79.9	57.6	47	38	45	44	63	32	47	48	2.24	0.63
A	23.348	23.49	23.22	57.7	73.7	66.0	65.8	86	46	77.8	56.4	44	39	44	42	64	35	49	49	1.57	0.50
S	23.379	23.51	23.26	53.1	68.7	61.6	61.1	80	38	72.0	51.9	46	42	47	45	78	41	60	60	2.41	0.56
O	23.320	23.63	22.86	42.5	58.9	50.3	50.6	78	31	62.4	40.4	29	28	31	29	62	35	50	49	1.50	1.04
N	23.309	23.50	23.00	34.4	50.8	40.6	41.9	67	15	53.3	30.8	19	18	21	19	57	32	50	46	0.66	0.24
D	23.185	23.46	22.82	21.5	33.4	25.4	26.8	46	−8	36.1	17.9	14	13	13	13	72	46	61	60	0.32	0.16
Y	23.285	23.63	22.82	41.1	56.8	49.0	49.0	87	−8	60.9	38.3	28	26	28	28	62	36	49	49	13.38	.....

SAVANNAH, GA.

[Latitude, 32° 5′ N.; longitude, 81° 5′ W.]

J	30.093	30.45	29.68	41.3	52.9	44.8	46.3	71	16	54.9	37.1	35	35	36	35	80	56	72	70	3.71	0.71
F	30.170	30.57	29.74	54.2	65.2	56.8	58.7	80	35	68.2	51.5	49	52	52	51	86	67	87	80	3.63	1.08
M	29.950	30.35	29.57	49.1	65.1	55.4	56.5	81	32	67.4	46.7	40	40	42	41	72	43	64	60	0.76	0.36
A	29.996	30.36	29.53	57.6	71.0	62.6	63.7	89	36	74.9	54.7	51	50	53	51	79	52	74	68	2.06	0.90
M	29.939	30.24	29.69	68.1	79.1	70.3	72.5	89	56	82.0	65.1	62	61	65	62	81	56	82	73	2.73	0.91
J	29.937	30.16	29.71	73.2	83.5	74.5	77.1	100	60	86.6	69.2	68	68	69	68	85	63	84	77	10.76	6.10
J	29.946	30.12	29.72	77.4	85.5	78.4	80.4	102	69	90.1	73.8	74	73	74	74	88	68	87	81	4.72	1.24
A	29.891	30.08	26.57	76.3	85.5	77.8	79.9	98	65	88.2	72.9	72	72	72	72	88	64	83	78	1.89	0.98
S	30.011	30.16	29.76	68.3	79.2	72.5	73.3	93	50	82.0	66.3	66	67	68	67	92	68	85	82	1.97	0.82
O	29.965	30.19	29.66	60.5	72.0	64.1	65.5	85	42	73.4	58.1	57	59	59	58	89	67	85	80	4.13	1.20
N	30.053	30.43	29.66	49.4	64.7	55.2	56.4	78	26	66.5	46.7	45	47	48	47	86	55	78	73	0.29	0.20
D	30.047	30.49	29.47	46.7	55.7	49.9	50.8	71	28	58.2	43.2	43	43	44	43	88	66	80	78	7.92	3.71
Y	30.001	30.57	29.47	60.2	71.6	63.5	65.1	102	16	74.4	57.1	55	56	57	56	85	60	80	75	44.64	.....

SHREVEPORT, LA.

[Latitude, 32° 30′ N.; longitude, 93° 40′ W.]

J	29.886	30.40	29.36	37.3	52.0	46.4	45.2	76	12	57.6	34.1	32	37	37	35	82	61	71	71	3.26	2.00
F	29.917	30.30	29.40	52.4	60.4	56.0	56.3	78	34	65.8	48.2	48	49	50	49	85	69	81	78	3.31	0.98
M	29.822	30.16	29.55	52.1	68.9	61.9	61.0	84	35	74.3	50.1	47	50	51	49	83	54	68	68	1.28	1.08
A	29.796	30.13	29.32	57.2	77.1	68.4	67.6	96	39	81.8	55.9	52	55	56	55	84	49	66	66	0.44	0.23
M	29.737	29.92	29.45	67.1	84.6	74.5	75.4	99	53	88.3	65.6	64	66	67	66	90	55	77	74	5.15	2.43
J	29.724	29.86	29.51	72.2	89.6	78.7	80.2	101	66	93.3	70.9	68	68	70	69	87	52	76	71	4.00	1.89
J	29.774	29.96	29.63	75.2	90.9	81.2	82.4	104	69	95.4	73.8	72	74	74	74	90	60	80	77	3.85	1.29
A	29.728	29.85	29.59	74.5	89.5	80.7	81.6	102	66	94.0	73.3	70	73	73	72	87	59	77	74	2.07	1.34
S	29.783	29.95	29.49	68.6	86.3	76.8	77.2	100	54	89.8	67.5	64	66	67	66	86	53	73	71	3.64	1.70
O	29.848	30.15	29.61	55.8	72.9	63.9	64.2	91	38	76.2	54.3	52	55	56	54	86	55	76	72	3.05	2.92
N	29.892	30.32	29.64	47.1	64.4	56.2	55.9	80	26	68.6	44.8	43	47	48	46	87	56	76	73	5.45	2.90
D	29.853	30.40	29.30	41.9	49.1	45.3	45.4	74	20	53.3	39.5	38	43	40	40	87	80	82	84	6.72	3.18
Y	29.814	30.40	29.30	58.4	73.8	65.8	66.0	104	12	78.2	56.5	54	57	57	56	86	59	75	73	42.22	.....

SITKA, ALASKA.

[Latitude, 57° 3′ N.; longitude, 135° 19′ W.]

J	29.475	30.41	28.62	27.7	31.1	29.7	29.5	48	−2	35.9	23.0	20	22	23	22	72	70	74	72	7.83	2.12
F	29.913	30.45	29.34	22.9	28.2	26.3	25.8	41	−3	33.1	18.1	16	20	20	19	73	72	77	74	4.92	2.07
M	29.666	30.23	29.16	30.9	35.3	34.5	33.6	49	4	39.5	27.5	25	26	27	26	77	68	75	74	7.38	0.95
A	29.731	30.16	29.03	36.2	41.9	41.1	39.7	52	22	46.1	32.4	30	32	32	31	78	68	70	72	6.64	1.27
M	29.855	30.36	29.05	42.2	46.6	45.8	44.9	58	28	50.8	37.6	36	36	37	36	79	69	73	73	7.30	3.25
J	29.909	30.30	29.44	45.7	51.9	52.0	49.9	72	40	56.8	43.5	41	43	43	42	85	72	73	76	5.01	2.42
J	30.011	30.26	29.47	49.6	53.6	53.9	52.4	66	42	57.5	47.3	47	49	48	48	90	84	83	85	7.62	0.91
A	29.917	30.24	29.48	51.8	56.5	56.9	55.1	68	41	60.6	48.6	49	51	51	50	90	82	80	84	9.38	4.79
S	29.802	30.18	29.06	48.1	53.5	53.2	51.6	60	36	57.0	45.4	44	46	46	46	86	78	79	81	10.56	1.75
O	.....	.....	.....	.....	.....	.....	.....	...	...	.....	.....	...	...	...	...	...	...	...	...	.....	.....
N	.....	.....	.....	.....	.....	.....	.....	...	...	.....	.....	...	...	...	...	...	...	...	...	.....	.....
D	.....	.....	.....	.....	.....	.....	.....	...	...	.....	.....	...	...	...	...	...	...	...	...	.....	.....
Y	.....	.....	.....	.....	.....	.....	.....	...	...	.....	.....	...	...	...	...	...	...	...	...	.....	.....

Monthly and yearly meteorological summaries—Continued.

SANTA FÉ, N. MEX.

[$H = 7,026$. $T = 35$. $h = 29$.]

Cloudiness (in tenths).				Wind.													Number of days—										
7 a. m.	3 p. m.	10 p. m.	Mean.	Total (miles).	Maximum.	Direction.	Prevailing direction.	North.	Northeast.	East.	Southeast.	South.	Southwest.	West.	Northwest.	Calms.	Clear.	Fair.	Cloudy.	Foggy.	Rain or snow.	Max. below 32°.	Min. below 32°.	Max. above 90°.	Thunder-storms.	Auroras.	Months and year.
1.7	2.5	1.8	2.0	4,671	23	N.	N.	39	9	4	1	6	7	10	6	11	21	9	1	0	3	3	29	0	0	0	J.
3.1	4.1	2.0	3.1	3,910	24	SW.	SW.	17	4	14	10	8	21	5	1	4	14	12	2	0	5	1	26	0	0	0	F.
1.9	2.8	1.4	2.0	2,830	15	E.	N.	28	14	9	4	4	13	5	11	5	23	8	0	0	3	0	29	0	0	0	M.
3.5	4.5	2.3	3.4	3,103	18	S.	SW.	18	2	3	12	11	21	12	5	6	17	10	3	0	5	0	13	0	0	0	A.
2.6	4.5	2.6	3.2	1,569	10	NW., N.	SW.	7	8	12	10	8	24	4	5	15	14	15	2	0	7	0	3	0	0	0	M.
2.3	5.2	3.4	3.6	2,228	25	E.	E., SE.	6	7	16	16	12	14	6	0	13	13	16	1	0	9	0	0	0	1	0	J.
4.5	5.3	4.8	4.2	3,371	26	N.	S.	10	8	12	15	16	11	4	5	12	13	13	5	0	14	0	0	0	0	0	J.
2.4	4.6	3.9	3.6	3,454	24	NW., E., NE., W., SE.	E. SW.	6	7	16	15	14	16	5	3	11	13	17	1	0	11	0	0	0	0	0	A.
3.6	5.0	3.9	4.2	2,958	28	SW.	E.	13	8	17	14	8	13	1	6	10	13	14	3	0	12	0	0	0	0	0	S.
1.6	2.5	1.3	1.8	3,328	24	S., N.	SW.	14	5	12	16	7	18	6	4	11	22	8	1	0	4	0	2	0	0	0	O.
2.1	3.5	2.4	2.7	3,228	25	N.	N.	25	15	13	4	8	9	3	3	10	19	7	4	0	6	0	13	0	0	0	N.
3.5	4.2	2.4	3.4	3,973	36	W.	N.	30	21	4	2	4	8	8	3	13	17	10	4	0	4	5	30	0	0	0	D.
2.6	4.1	2.7	3.1	38,623	..	.....	N.	213	108	132	119	106	175	69	52	121	199	139	27	0	83	9	136	0	1	0	Y.

SAVANNAH, GA.

[$H = 87$. $T = 66$. $h = 56$.]

4.5	4.3	4.0	4.3	6,297	29	NW.	S.	17	5	3	3	22	11	13	18	1	12	13	6	0	14	0	8	0	1	0	J.
5.2	6.7	4.9	5.6	5,222	32	NE.	NE.	9	16	10	4	10	13	10	11	1	8	10	10	0	14	0	0	0	3	0	F.
3.4	3.4	2.2	3.0	6,199	25	NW.	NW.	2	5	7	7	11	16	18	26	1	18	9	4	0	7	0	0	0	2	0	M.
2.3	3.2	1.9	2.5	6,298	32	E.	S.	5	7	10	11	21	12	12	12	0	20	7	3	0	6	0	0	0	3	0	A.
3.7	5.2	4.2	4.4	5,249	23	NE., E.	S.	5	11	9	15	25	13	8	6	1	8	18	4	0	11	0	0	0	9	0	M.
4.5	5.1	4.4	4.7	4,933	22	NE.	E.	6	12	18	11	17	15	8	2	1	10	15	5	0	12	0	0	10	8	0	J.
5.3	6.4	4.0	5.2	4,875	36	S.	SW.	4	3	5	10	28	35	6	2	0	4	20	7	0	11	0	0	14	14	0	J.
3.5	5.4	2.8	3.9	5,310	25	SW., NE., E.	S.	10	14	15	8	22	15	6	3	0	15	11	5	0	10	0	0	11	8	0	A.
2.5	5.0	2.8	3.4	5,399	30	E., W.	E.	9	17	30	9	16	6	0	2	1	14	11	5	0	7	0	0	2	2	0	S.
4.7	5.4	4.1	4.7	5,355	30	NE.	N.	25	14	15	3	7	4	6	16	3	11	12	8	0	9	0	0	0	0	0	O.
4.4	3.9	1.9	3.4	4,192	23	NW.	E.	17	7	19	11	1	10	10	14	1	14	11	5	0	6	0	1	0	0	0	N.
6.9	6.7	4.0	5.9	4,855	30	W.	NW.	5	19	14	4	4	3	17	23	4	6	16	9	0	10	0	2	0	0	0	D.
4.2	5.1	3.4	4.2	64,184	..	.....	S.	114	130	155	96	184	153	114	135	14	140	153	71	0	117	0	11	37	50	0	Y.

SHREVEPORT, LA.

[$H = 227$. $T = 33$. $h = 40$.]

3.4	3.4	2.8	3.2	5,441	27	W.	S.	7	3	4	9	34	11	6	14	5	18	7	6	0	7	0	13	0	2	0	J.
5.8	7.1	4.9	5.9	5,202	28	NW.	S.	16	3	12	7	24	8	4	10	0	4	14	10	0	14	0	0	0	4	0	F.
2.5	2.6	1.2	2.1	5,045	26	NW., SW.	N.	23	3	6	10	20	10	8	12	1	21	7	3	0	3	0	0	0	3	0	M.
2.5	3.2	0.8	2.2	4,611	21	S., N.	S.	8	3	1	17	33	8	5	7	8	22	6	2	0	4	0	0	4	2	0	A.
4.5	3.8	2.8	3.7	3,850	25	S.	S.	4	2	2	17	32	14	8	7	7	14	14	3	0	8	0	0	15	4	0	M.
3.7	3.9	2.5	3.4	3,124	27	N., NE.	S.	6	8	15	22	25	2	3	1	8	16	11	3	0	11	0	0	26	9	0	J.
3.9	4.5	2.3	3.6	2,447	36	E.	S.	4	1	4	11	31	7	6	7	22	15	10	6	0	10	0	0	25	7	0	J.
4.0	5.7	2.1	3.9	2,534	18	SE. NE.	SE.	12	6	5	27	22	7	4	2	8	13	14	4	0	8	0	0	23	2	0	A.
3.7	4.0	1.6	3.1	3,194	24	E.	S.	10	5	9	20	24	7	5	4	6	18	10	2	0	7	0	0	19	1	0	S.
3.5	3.3	2.6	3.1	3,708	24	E., NW.	N.	22	14	7	12	18	2	3	5	10	18	7	6	0	5	0	0	2	0	0	O.
4.2	4.5	2.9	3.9	3,166	23	NW.	S.	13	11	8	10	16	4	8	12	8	14	9	7	0	7	0	4	0	0	0	N.
6.8	7.7	6.5	7.0	4,441	25	W.	N.	23	4	10	11	16	1	13	15	0	6	9	16	0	18	1	6	0	2	0	D.
4.0	4.5	2.8	3.8	46,763	..	.....	S.	148	63	83	173	295	81	73	96	83	179	118	68	0	102	1	23	114	36	0	Y.

SITKA, ALASKA.

[$H = 63$. $T = 12$. $h = 43$.]

7.8	7.3	7.3	7.5	8,543	56	NW.	E.	1	8	37	21	2	3	1	12	8	3	9	19	0	19	9	21	0	0	0	J.
5.0	5.6	5.0	5.2	5,993	40	SE.	NE.	4	31	21	11	0	0	0	8	9	10	8	10	0	13	11	28	0	0	0	F.
7.4	7.6	8.5	7.8	7,796	49	SE.	E.	0	8	27	18	2	0	8	14	16	2	8	21	0	23	3	17	0	0	0	M.
7.2	7.3	6.9	7.1	7,122	54	SE.	E.	0	0	21	17	9	8	16	3	16	4	7	19	0	21	0	12	0	0	2	A.
8.0	7.6	7.8	7.8	6,697	38	SE.	W.	0	1	14	17	1	10	22	16	12	1	13	17	0	20	0	3	0	0	0	M.
7.9	7.7	7.3	7.6	5,807	32	SE.	NW.	0	0	6	14	5	18	12	21	14	4	4	22	0	14	0	0	0	0	0	J.
8.1	7.6	7.7	7.8	5,041	30	SE., S.	SW.	1	1	5	8	4	32	14	14	14	5	3	23	0	21	0	0	0	0	0	J.
7.6	7.2	6.5	7.1	4,525	36	SE.	SW.	0	0	5	17	5	18	13	10	25	5	7	19	0	21	0	0	0	0	0	A.
7.3	7.5	6.6	7.1	6,030	42	E., SE.	SW.	3	8	9	17	2	19	8	7	17	5	8	17	0	20	0	0	0	0	0	S.
..	..	..	..	.....	..	.....	.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	O.
..	..	..	..	.....	..	.....	.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	N.
..	..	..	..	.....	..	.....	.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	D.
..	..	..	..	.....	..	.....	.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	Y.

Monthly and yearly meteorological summaries—Continued.

SPOKANE FALLS, WASH.

[Latitude, 47° 40′ N.; longitude, 117° 25′ W.]

Months and year.	Pressure.			Temperature.								Dew point.				Relative humidity.				Precipitation.	
	Mean.	Maximum.	Minimum.	7 a. m.	3 p. m.	10 p. m.	Mean.	Maximum.	Minimum.	Mean. Maximum.	Mean. Minimum.	7 a. m.	3 p. m.	10 p. m.	Mean.	7 a. m.	3 p. m.	10 p. m.	Mean.	Total.	Max. 24 hours.
	In.	In.	In.	°	°	°	°	°	°	°	°	°	°	°	°					In.	In.
J..	27.848	28.36	27.15	28.0	34.3	32.4	31.6	51	9	35.0	25.2	25	29	29	28	87	82	87	85	1.91	0.51
F..	27.919	28.20	27.39	12.6	23.0	19.8	18.5	53	-11	27.8	8.7	8	20	16	15	83	88	87	86	1.64	0.63
M.	28.013	28.52	27.60	35.7	48.0	44.0	42.6	66	15	53.8	31.9	32	42	39	37	86	81	82	83	2.50	0.57
A..	27.937	28.35	27.48	39.6	52.7	48.7	47.0	86	26	60.2	35.9	35	40	39	38	85	65	70	73	1.83	0.51
M.	27.964	28.36	27.53	44.6	62.8	62.0	56.5	95	30	69.0	41.4	33	47	46	42	67	58	58	61	1.06	0.79
J..	27.913	28.27	27.31	49.3	66.0	65.3	60.2	94	38	73.0	46.4	42	50	53	48	77	58	67	67	2.06	0.62
J..	27.990	28.14	27.80	54.3	78.3	77.3	70.0	94	41	84.4	52.2	46	50	50	49	74	39	40	51	1.41	1.05
A..	27.912	28.16	27.67	55.8	75.5	73.1	68.1	97	43	81.9	52.3	49	53	53	52	78	47	52	59	1.26	0.80
S..	28.015	28.30	27.70	46.5	64.1	59.6	56.7	84	32	70.6	42.6	42	48	49	46	86	57	69	71	1.29	0.53
O..	28.149	28.53	27.62	38.0	51.7	47.2	45.6	69	12	57.4	33.3	35	39	40	38	89	64	76	76	1.04	0.38
N..	28.087	28.46	27.72	32.0	40.8	37.3	36.7	59	10	44.6	27.4	29	31	33	31	90	69	85	81	1.22	0.45
D..	27.989	28.61	27.31	30.8	34.8	33.4	33.0	53	15	38.7	26.1	27	28	29	28	87	77	85	83	2.88	0.60
Y..	27.978	28.61	27.15	38.9	52.7	50.0	47.2	97	-11	58.3	35.3	34	40	40	38	82	66	72	73	20.10	.....

SPRINGFIELD, ILL.

[Latitude, 39° 48′ N.; longitude, 89° 39′ W.]

J..	29.337	29.93	28.66	19.3	27.1	23.7	23.4	61	-18	34.6	12.9	12	18	15	15	71	68	70	70	1.09	0.60
F..	29.462	30.08	28.55	31.8	38.3	35.9	35.3	65	0	45.1	25.8	25	30	28	28	75	71	72	73	4.26	0.86
M.	29.398	29.81	28.87	35.1	46.4	40.6	40.7	71	18	50.1	31.2	27	32	31	30	72	58	70	67	1.41	0.60
A..	29.302	29.67	28.74	46.4	62.8	56.3	55.2	84	26	66.4	43.0	38	43	44	42	72	51	65	63	2.89	1.22
M.	29.307	29.61	28.94	59.9	74.5	67.1	67.2	86	47	77.6	57.2	54	56	56	56	80	54	70	68	1.92	0.62
J..	29.326	29.62	29.09	65.1	80.7	72.1	72.6	96	51	83.7	62.2	59	62	63	61	82	54	74	70	3.07	2.13
J..	29.313	29.46	29.15	70.8	88.6	79.6	79.7	100	58	91.6	68.2	65	70	69	68	83	56	71	70	1.01	0.37
A..	29.332	29.50	29.14	65.3	83.5	74.2	74.3	97	49	85.5	63.2	58	58	59	58	79	45	60	61	1.05	0.84
S..	29.395	29.72	29.06	58.6	73.2	66.0	65.9	96	37	76.4	56.1	53	53	55	54	84	55	69	69	2.89	0.89
O..	29.424	29.88	28.92	42.7	58.1	50.3	50.4	84	20	61.0	40.3	37	39	40	39	82	52	68	67	0.85	0.44
N..	29.414	29.96	28.81	34.0	48.0	41.5	41.2	77	4	52.6	a30.4	26	28	30	28	74	48	66	63	1.36	0.72
D..	29.393	30.02	28.77	25.0	32.2	27.7	28.3	56	-10	35.8	20.3	19	23	22	21	79	69	78	75	3.33	1.13
Y..	29.367	30.08	28.55	46.2	59.4	52.9	52.8	100	-18	63.4	42.6	40	43	43	42	78	57	70	68	25.15	.....

SPRINGFIELD, MO.

[Latitude, 37° 12′ N.; longitude, 93° 18′ W.]

J..	.....	.....	.....	.....	.....	.....	.....	...	...	.....	.....	...	...	...	...	...	...	...	...	.....	.....
F..	.....	.....	.....	.....	.....	.....	.....	...	...	.....	.....	...	...	...	...	...	...	...	...	.....	.....
M.	.....	.....	.....	.....	.....	.....	.....	...	...	.....	.....	...	...	...	...	...	...	...	...	.....	.....
A..	.....	.....	.....	.....	.....	.....	.....	...	...	.....	.....	...	...	...	...	...	...	...	...	.....	.....
M.	.....	.....	.....	.....	.....	.....	.....	...	...	.....	.....	...	...	...	...	...	...	...	...	.....	.....
J..	.....	.....	.....	.....	.....	.....	.....	...	...	.....	.....	...	...	...	...	...	...	...	...	.....	.....
J..	.....	.....	.....	.....	.....	.....	.....	...	...	.....	.....	...	...	...	...	...	...	...	...	.....	.....
A..	.....	.....	.....	.....	.....	.....	.....	...	...	.....	.....	...	...	...	...	...	...	...	...	.....	.....
S..	.....	.....	.....	.....	.....	.....	.....	...	...	.....	.....	...	...	...	...	...	...	...	...	.....	.....
O..	28.678	28.98	28.28	46.3	63.6	54.1	54.7	88	21	66.9	43.4	41	46	44	44	83	54	69	68	2.08	1.35
N..	28.669	29.08	28.34	37.9	54.7	44.9	45.8	79	8	59.0	34.8	30	36	32	33	76	54	63	64	3.27	2.51
D..	28.619	29.16	28.05	26.9	36.7	30.9	31.5	64	- 5	42.2	23.3	23	28	25	26	86	73	81	80	2.39	1.06
Y..	.....	.....	.....	.....	.....	.....	.....	...	...	.....	.....	...	...	...	...	...	...	...	...	.....	.....

TATOOSH ISLAND, WASH.

[Latitude, 48° 23′ N.; longitude, 124° 44′ W.]

J..	29.799	30.29	29.04	42.6	43.5	42.7	42.9	51	31	46.0	38.7	39	39	38	39	86	85	85	85	14.46	1.48
F..	29.789	30.26	29.30	33.5	34.3	35.1	34.3	47	15	37.9	30.4	29	29	29	29	83	81	78	80	11.30	3.66
M.	29.937	30.45	29.31	42.7	44.8	44.3	43.9	55	33	48.4	40.0	39	39	39	39	86	81	84	84	16.36	3.79
A..	29.932	30.41	29.37	43.8	47.3	45.6	45.6	54	35	49.6	41.2	39	40	40	40	85	78	81	81	08.51	1.40
M.	29.900	30.25	29.21	47.3	51.8	50.4	49.8	69	36	55.7	44.8	43	45	44	44	86	80	80	82	08.85	1.95
J..	29.947	30.24	29.60	49.6	54.1	53.3	52.3	69	46	58.2	48.0	46	49	48	48	88	82	83	84	01.12	0.35
J..	30.026	30.18	29.82	50.8	56.7	54.3	53.9	68	46	59.9	49.3	50	54	51	52	97	89	91	92	01.24	0.61
A..	29.920	30.21	29.73	52.0	57.3	54.8	54.7	66	44	60.4	50.2	51	55	53	53	97	92	94	94	01.39	0.65
S..	29.927	30.19	29.55	50.7	54.7	52.5	52.6	70	42	58.1	48.3	49	52	50	50	91	89	93	92	03.43	0.97
O..	30.047	30.37	29.55	48.7	50.4	49.8	49.6	60	40	54.0	46.5	46	46	46	46	91	87	90	89	11.87	4.59
N..	29.938	30.42	29.33	45.2	46.3	46.1	45.9	58	36	49.8	42.7	41	41	41	41	88	82	84	85	10.15	2.32
D..	29.817	30.57	29.02	43.0	44.7	43.8	43.8	52	35	47.0	40.3	40	41	40	40	90	88	87	88	17.47	2.30
Y..	29.915	30.57	29.02	45.8	48.8	47.7	47.4	70	15	52.1	43.4	43	44	43	43	89	84	86	86	106.11	....

Monthly and yearly meteorological summaries—Continued.

SPOKANE FALLS, WASH.

[H=1,909. T=57. h=48.]

Cloudiness (in tenths).				Wind.													Number of days—										
7 a. m.	3 p. m.	10 p. m.	Mean.	Total (miles).	Maximum.	Direction.	Prevailing direction.	North.	Northeast.	East.	Southeast.	South.	Southwest.	West.	Northwest.	Calms.	Clear.	Fair.	Cloudy.	Foggy.	Rain or snow.	Max. below 32°.	Min. below 32°.	Max. above 90°.	Thunder storms.	Auroras.	Months and year.
4.2	6.8	5.7	5.6	5,005	31	SW.	SW.	3	5	7	7	4	52	7	1	7	5	17	9	0	13	3	25	0	0	0	J.
7.2	6.8	6.0	6.7	2,545	20	SE.	E.	0	11	19	5	17	18	5	0	9	3	13	12	0	15	19	26	0	0	0	F.
5.7	6.4	4.8	5.6	3,774	25	S.	SW.	4	5	16	4	16	36	5	1	6	9	11	11	0	15	0	15	0	0	0	M.
5.8	7.1	6.0	6.3	3,518	25	SW.	SW.	0	4	5	3	31	34	7	4	2	2	18	10	0	13	0	10	0	1	0	A.
3.3	4.3	3.4	3.7	3,433	19	SW.	SW.	2	10	3	0	13	29	19	8	9	17	10	4	0	8	0	5	2	0	0	M.
4.0	5.2	5.1	4.8	2,477	13	S.	SW.	7	6	8	3	14	25	9	6	12	8	16	6	0	10	0	0	1	2	0	J.
2.3	2.4	2.9	2.5	1,860	12	SW.	SW.	2	17	1	8	4	34	4	5	18	20	10	1	0	4	0	0	9	1	0	J.
2.7	4.9	4.2	3.9	1,841	10	SW.	SW.	0	23	3	3	1	33	2	8	22	14	11	6	0	4	0	0	3	2	0	A.
3.4	6.0	4.6	4.7	1,529	7	SW.	SW.	1	19	1	7	1	31	1	3	26	11	11	8	0	8	0	1	0	2	0	S.
4.2	5.7	3.7	4.5	1,491	12	SW, NE	NE.	0	23	2	4	0	19	2	9	34	9	17	5	0	8	0	12	0	0	1	O.
5.3	7.4	5.9	6.2	2,614	24	SW.	NE.	0	31	2	12	0	22	4	7	12	4	11	15	0	10	2	18	0	0	0	N.
7.3	8.6	7.4	7.8	4,433	26	SW.	SW.	0	29	0	14	2	39	0	9	0	3	8	20	0	18	6	25	0	0	0	D.
4.6	6.0	5.0	5.2	34,490	..	.....	SW.	19	183	65	70	103	372	65	61	157	105	153	107	0	126	30	137	15	8	1	Y.

SPRINGFIELD, ILL.

[H=644. T=80. h=64.]

5.0	5.9	4.8	5.2	7,969	28	S.	NW.	3	6	5	5	22	9	11	25	7	8	14	9	0	7	12	28	0	0	0	J.
6.2	6.5	5.2	6.0	7,413	36	W.	SE.	8	7	5	14	13	7	13	10	7	5	13	10	0	13	4	18	0	2	0	F.
4.6	6.1	3.2	4.6	7,504	34	NW.	NW.	18	15	9	7	10	7	7	19	1	11	14	6	0	7	1	17	0	0	0	M.
4.2	5.1	3.3	4.2	8,246	34	NW., W	S.	10	3	4	4	32	13	12	12	0	12	13	5	0	8	0	3	0	3	0	A.
5.0	5.7	3.3	4.7	5,154	28	S.	S.	9	8	10	11	20	6	10	11	8	13	9	9	0	11	0	0	0	8	0	M.
3.7	5.0	3.5	4.1	5,152	25	NE.	SW.	3	3	11	11	11	21	12	11	7	12	13	5	0	7	0	0	3	5	0	J.
2.8	4.7	2.2	3.2	4,535	24	SW, NE	SW.	16	7	8	5	14	19	6	15	3	17	11	3	0	9	0	0	18	5	0	J.
4.8	5.2	3.3	4.4	5,143	24	NW., SW.	N.	21	16	12	19	6	7	6	6	0	10	16	5	0	4	0	0	10	4	0	A.
6.1	6.5	3.9	5.5	5,372	30	NW.	S.	11	11	12	10	25	11	4	3	3	10	10	10	0	8	0	0	4	1	0	S.
4.5	4.5	2.8	3.9	6,304	31	W.	NW.	16	4	1	4	21	11	10	25	1	11	15	5	0	4	0	6	0	1	0	O.
3.2	3.0	2.7	3.0	6,445	42	NW.	S.	6	7	5	3	21	14	10	20	4	16	10	4	0	6	2	12	0	0	0	N.
6.2	6.8	5.9	6.3	6,893	36	S.	S.	10	5	4	5	30	5	18	11	5	6	13	12	0	9	8	24	0	0	0	D.
4.7	5.4	3.7	4.6	76,130	..	.....	S.	131	92	86	98	225	136	119	168	46	131	151	83	0	93	27	108	35	29	0	Y.

SPRINGFIELD, MO.

[H=1,356. T=77. h=74.]

...	...	...	...	.....	..	.....	.....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	J.
...	...	...	...	.....	..	.....	.....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	F.
...	...	...	...	.....	..	.....	.....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	M.
...	...	...	...	.....	..	.....	.....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	A.
...	...	...	...	.....	..	.....	.....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	M.
...	...	...	...	.....	..	.....	.....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	J.
...	...	...	...	.....	..	.....	.....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	J.
...	...	...	...	.....	..	.....	.....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	A.
...	...	...	...	.....	..	.....	.....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	S.
2.5	2.5	2.5	2.5	7,078	40	S.	N.	20	10	9	16	12	11	4	9	2	21	6	4	0	5	0	3	0	1	0	O.
3.7	3.0	3.1	3.3	7,391	48	NW.	SE.	9	9	1	30	14	12	5	10	0	18	6	6	0	5	0	10	0	1	0	N.
5.2	5.8	4.6	5.2	8,443	44	SE.	SE.	7	7	4	31	8	8	7	21	0	10	12	9	0	13	5	23	0	1	0	D.
...	...	...	...	.....	..	.....	.....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	Y.

TATOOSH ISLAND, WASH.

[T=86. H=5. h=1.]

8.3	8.4	7.0	7.9	12,911	52	W.	SW.	0	0	8	17	6	25	20	17	0	0	12	19	0	29	0	3	0	0	0	J.
5.9	5.7	4.5	5.4	10,957	55	E.	E.	0	3	39	14	1	11	5	7	4	6	13	9	0	19	4	13	0	0	0	F.
7.4	7.2	7.9	7.5	10,831	50	W.	SE.	0	0	22	30	1	19	16	4	1	4	6	21	0	23	0	0	0	0	1	M.
6.5	6.1	7.2	6.6	8,632	57	SE.	W.	0	1	12	12	7	21	22	10	5	4	12	14	0	19	0	0	0	0	1	A.
6.1	6.1	5.7	6.0	10,522	48	E.	SW.	1	5	20	22	6	25	9	5	0	9	8	14	0	15	0	0	0	1	0	M.
7.6	5.5	4.8	6.0	5,766	46	E.	SW.	0	2	7	14	4	35	19	6	3	6	16	8	0	9	0	0	0	0	0	J.
6.6	5.4	4.1	5.4	6,025	24	S, SW, SE.	SW.	0	0	1	11	9	62	7	2	1	6	17	8	2	9	0	0	0	0	0	J.
3.7	5.2	4.3	5.1	5,058	36	E.	SW.	0	2	4	37	3	42	2	3	0	7	16	8	1	4	0	0	0	0	0	A.
5.5	4.9	5.7	5.4	7,206	42	SE.	SW.	0	4	21	21	7	33	2	2	0	6	16	8	0	10	0	0	0	0	0	S.
5.3	5.7	5.6	5.5	10,053	56	E.	E.	1	8	40	17	11	7	6	3	0	8	13	10	0	17	0	0	0	0	0	O.
5.6	7.4	6.9	6.6	11,177	57	SE.	E.	0	2	44	23	5	9	5	1	1	5	9	16	0	17	0	0	0	1	0	N.
8.5	8.7	7.6	8.3	12,229	51	SW.	SE.	0	1	22	26	6	15	19	3	1	1	7	23	0	25	0	0	0	1	0	D.
6.6	6.4	5.9	6.3	112,867	..	.....	SW.	2	28	240	244	66	304	132	63	16	62	145	158	3	196	4	16	0	2	3	Y.

Monthly and yearly meteorological summaries—Continued.

TITUSVILLE, FLA.

[Latitude, 28° 34′ N.; longitude, 80° 51′ W.]

Months and year.	Pressure.			Temperature.								Dew point.				Relative humidity.				Precipitation.	
	Mean.	Maximum.	Minimum.	7 a. m.	3 p. m.	10 p. m.	Mean.	Maximum.	Minimum.	Mean. Maximum.	Mean. Minimum.	7 a. m.	3 p. m.	10 p. m.	Mean.	7 a. m.	3 p. m.	10 p. m.	Mean.	Total.	Max. 24 hours.
	In.	In.	In.	°	°	°	°	°	°	°	°	°	°	°	°					In.	In.
J	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
F	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
M	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
A	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
M	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
J	29.991	30.13	29.85	77.2	81.2	76.7	78.4	93	65	85.3	71.8	73	73	73	73	86	77	89	84	4.16	1.85
J	30.065	30.19	29.93	78.0	85.8	77.6	80.5	99	68	89.9	72.3	75	75	74	75	91	72	88	84	7.82	1.72
A	29.952	30.11	29.55	77.8	85.6	79.1	80.8	94	69	88.1	73.6	74	74	75	74	88	69	86	81	2.47	1.01
S	30.028	30.14	29.87	75.8	80.4	77.2	77.8	92	64	82.3	72.6	71	71	71	71	85	74	83	80	6.32	2.17
O	29.998	30.18	29.79	71.8	78.5	74.2	74.8	87	45	80.3	69.2	68	68	68	68	88	72	82	80	12.17	3.95
N	30.092	30.30	29.78	60.7	71.3	64.2	65.4	82	32	73.0	57.5	56	58	57	57	84	64	78	75	0.88	0.40
D	30.102	30.40	29.64	59.7	67.9	62.1	63.2	81	40	69.9	55.6	55	57	56	56	86	70	82	79	1.91	0.39
Y	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

TOLEDO, OHIO.

[Latitude, 41° 40′ N.; longitude, 83° 34′ W.]

J	29.269	29.83	28.64	19.9	25.4	20.4	21.9	60	-10	28.7	12.3	14	18	15	16	78	73	80	77	2.21	0.73
F	29.436	30.10	28.52	26.7	31.7	29.1	29.2	58	2	36.4	21.4	21	25	24	23	80	78	82	80	6.84	1.87
M	29.349	29.93	28.63	27.7	36.6	31.2	31.8	60	8	39.5	24.2	21	22	23	22	77	58	72	69	1.12	0.68
A	29.290	29.79	28.64	40.6	51.6	45.2	45.8	77	18	56.0	36.4	32	32	33	32	73	49	64	62	1.57	0.36
M	29.325	29.60	28.98	59.0	69.5	62.5	63.7	91	46	73.1	55.1	50	50	52	51	74	52	71	65	1.46	0.39
J	29.324	29.71	29.02	65.4	74.6	68.5	69.5	92	48	78.8	60.6	58	58	60	59	78	59	74	70	3.26	1.43
J	26.305	29.49	28.99	70.9	84.5	76.1	77.2	99	52	87.3	67.0	63	64	66	64	76	51	72	66	3.13	1.10
A	29.332	29.61	29.07	63.8	75.8	69.0	69.5	96	47	79.1	60.0	56	55	57	56	75	52	67	65	1.81	0.84
S	29.416	29.72	29.03	55.4	67.3	60.9	61.2	93	34	71.1	52.7	50	51	53	51	82	59	76	72	3.37	1.27
O	29.355	29.77	28.90	42.4	54.2	47.8	48.1	81	21	57.6	40.1	35	36	36	36	77	52	66	65	1.82	0.82
N	29.353	30.12	28.60	34.4	43.2	38.2	38.6	66	11	47.7	30.1	28	28	28	28	78	59	71	69	2.64	1.14
D	29.370	30.11	28.86	26.1	31.7	29.1	29.0	58	2	35.5	22.2	22	24	24	23	85	74	80	79	2.78	1.18
Y	29.344	30.12	28.52	44.4	53.8	48.2	48.8	99	-10	57.6	40.2	37	38	37	38	78	60	73	70	32.01	.....

TOPEKA, KANS.

[Latitude, 39° 3′ N.; longitude 95° 41′ W.]

J	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
F	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
M	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
A	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
M	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
J	.....	.....	.....	65.5	83.3	70.3	73.0	100	47	88.6	61.4	60	64	63	62	83	56	78	72	9.57	2.08
J	.....	.....	.....	68.5	90.8	76.3	78.5	104	53	94.4	64.3	63	64	66	64	82	43	72	66	1.06	0.38
A	.....	.....	.....	65.0	83.1	70.9	73.0	104	46	85.9	63.1	62	69	66	66	91	64	85	80	5.39	2.22
S	.....	.....	.....	59.9	76.0	65.3	67.1	97	41	79.2	57.6	57	63	60	60	91	66	85	81	4.67	2.09
O	.....	.....	.....	41.6	64.2	50.2	52.0	90	22	66.4	39.1	38	46	44	42	88	54	79	74	3.39	2.92
N	.....	.....	.....	33.3	53.1	40.2	42.2	82	-5	55.8	28.6	28	37	32	32	83	58	74	72	1.21	0.70
D	.....	.....	.....	22.6	33.8	26.3	27.6	58	-9	38.6	17.9	18	25	20	21	84	72	80	79	0.89	0.58
Y	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

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[Latitude, 34° 20′ N.; longitude, 89° 27′ W.]

J	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
F	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
M	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
A	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
M	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
J	.....	.....	.....	69.3	85.0	75.1	76.5	99	57	88.4	67.2	65	69	68	67	87	62	79	76	5.67	2.70
J	.....	.....	.....	73.1	87.9	77.9	79.6	98	67	90.1	71.9	72	78	74	74	94	74	88	85	4.69	1.48
A	.....	.....	.....	72.4	87.8	77.5	79.2	99	60	90.6	69.4	68	69	68	69	87	56	75	73	1.26	0.49
S	.....	.....	.....	67.2	85.8	74.6	75.9	99	50	87.1	65.4	60	64	62	62	79	50	66	65	3.60	1.82
O	.....	.....	.....	52.5	69.0	59.5	60.3	85	31	70.9	50.5	47	54	50	51	82	61	73	72	3.50	2.67
N	.....	.....	.....	46.4	60.2	51.7	52.8	74	17	62.1	41.7	39	46	41	42	75	62	67	68	1.28	0.68
D	.....	.....	.....	38.8	45.3	42.3	42.1	64	16	48.2	34.6	33	36	35	35	79	73	78	77	6.32	2.15
Y	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

Monthly and yearly meteorological summaries—Continued.

TITUSVILLE, FLA.

[H=12. T=16. h=1.]

Cloudiness (in tenths).				Wind.													Number of days—										
7 a. m.	3 p. m.	10 p. m.	Mean.	Total (miles).	Maximum.	Direction.	Prevailing direction.	North.	Northeast.	East.	Southeast.	South.	Southwest.	West.	Northwest.	Calms.	Clear.	Fair.	Cloudy.	Foggy.	Rain or snow.	Max. below 32°.	Min. below 32°.	Max. above 90.	Thunder-storms.	Auroras.	Months and year.
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	J.
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	F.
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	M.
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	A.
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	M.
4.8	7.0	4.2	5.3	...	...	...	S. E.	1	15	10	16	8	4	2	0	6	6	7	4	0	9	0	0	3	0	0	J.
2.7	6.1	3.4	4.1	5,806	30	S.	S.	2	8	6	24	27	16	6	1	3	14	13	4	0	14	0	0	19	16	0	J.
1.7	4.4	2.5	2.9	7,381	38	N. E.	S. E.	4	18	13	21	9	13	6	7	2	19	11	1	0	11	0	0	7	4	0	A.
4.2	5.7	4.3	4.7	8,912	40	N. E.	E.	10	23	33	12	3	3	2	4	0	12	10	8	0	18	0	0	1	2	0	S.
5.0	6.2	5.1	5.4	7,173	40	E.	E.	8	8	32	13	5	6	8	12	1	7	13	11	0	13	0	0	0	0	0	O.
3.7	4.5	3.6	3.9	5,945	38	N.	W, N W	16	12	12	8	1	5	20	20	1	9	19	2	0	11	0	0	0	0	0	N.
5.8	5.8	5.2	5.6	6,188	45	N.	N., W.	17	8	12	9	7	7	12	18	3	6	16	9	0	13	0	0	0	1	0	D.
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	Y.

TOLEDO, OHIO.

[H=651. T=115. h=100.]

7.3	7.6	5.8	6.9	8,732	35	S.	SW.	4	8	6	0	25	34	13	3	0	4	12	15	0	19	17	30	0	0	0	J.
7.4	7.7	5.6	6.9	7,082	37	S W.	SW.	6	13	8	5	17	18	7	9	1	1	15	12	0	21	13	25	0	2	0	F.
4.8	6.5	5.3	5.5	6,881	33	N E.	NW.	6	19	6	4	7	11	14	26	0	7	15	9	0	10	5	25	0	0	0	M.
5.6	6.6	3.5	5.2	7,351	52	N E.	SW.	3	19	9	6	13	22	12	6	0	5	20	5	0	12	0	6	0	0	0	A.
4.3	5.2	2.8	4.1	4,609	29	N E.	NE.	3	40	3	4	10	12	8	2	11	14	12	5	0	12	0	0	1	4	0	M.
5.1	5.5	3.3	4.6	4,997	24	N E.	NE.	5	26	9	3	9	18	13	5	2	10	15	5	0	12	0	0	1	5	0	J.
2.6	3.4	1.8	2.6	5,125	27	S. E.	NE.	8	24	4	6	11	21	15	3	1	16	13	2	0	8	0	0	12	6	0	J.
4.5	5.4	2.9	4.3	4,470	22	N., N W., NE.	NE.	14	34	6	3	8	6	6	12	4	11	13	7	0	8	0	0	6	1	0	A.
4.8	5.9	4.6	5.1	4,975	30	NE.	NE.	8	28	13	3	7	11	10	9	0	10	9	10	0	12	0	0	1	3	0	S.
5.5	6.2	5.5	5.7	5,917	44	W.	S.	7	1	2	5	26	19	22	11	0	7	11	13	0	11	0	8	0	0	0	O.
5.2	4.7	2.3	4.1	6,407	32	W., SW.	SW.	2	11	3	1	6	38	16	10	3	12	13	5	0	9	5	14	0	0	0	N.
6.8	7.1	6.9	6.9	5,774	32	SW., W.	SW.	2	11	5	9	12	33	16	5	0	4	9	18	0	11	10	25	0	0	0	D.
5.3	6.0	4.2	5.2	72,320	...	...	SW.	68	234	74	49	151	243	152	101	22	101	157	106	0	145	50	133	21	21	0	Y.

TOPEKA, KANS.

[H=—. T=4. h 1.]

...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	J.
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	F.
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	M.
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	A.
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	M.
3.8	4.0	4.6	4.1	...	...	...	...	...	...	...	...	...	...	...	...	...	14	9	7	0	12	0	0	11	5	0	J.
2.7	3.5	1.8	2.7	...	...	...	...	...	...	...	...	...	...	...	...	...	17	14	0	0	7	0	0	24	2	0	J.
5.5	5.8	3.1	4.8	...	...	...	...	...	...	...	...	...	...	...	...	...	7	17	7	0	12	0	0	12	6	0	A.
6.1	5.6	3.8	5.2	...	...	...	...	...	...	...	...	...	...	...	...	...	11	11	8	0	11	0	0	6	5	0	S.
2.8	2.3	2.9	2.7	...	...	...	...	...	...	...	...	...	...	...	...	...	20	8	3	0	7	0	6	1	0	0	O.
3.5	4.7	3.6	3.9	...	...	...	...	...	...	...	...	...	...	...	...	...	13	11	6	0	6	1	15	0	0	0	N.
4.8	4.7	3.9	4.5	...	...	...	...	...	...	...	...	...	...	...	...	...	13	9	9	0	9	7	28	0	1	0	D.
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	Y.

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[H=—. T=4. h=4.]

...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	J.
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	F.
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	M.
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	A.
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	M.
2.6	4.5	4.2	3.8	...	...	...	...	...	...	...	...	...	...	...	...	...	15	8	7	0	7	0	0	13	6	0	J.
3.7	4.5	3.7	4.0	...	...	...	...	...	...	...	...	...	...	...	...	...	12	14	5	0	17	0	0	19	4	0	J.
1.9	4.0	2.7	2.9	...	...	...	...	...	...	...	...	...	...	...	...	...	18	10	3	0	5	0	0	20	3	0	A.
3.7	4.8	2.7	3.7	...	...	...	...	...	...	...	...	...	...	...	...	...	14	10	6	0	4	0	0	16	0	0	S.
4.2	2.7	2.6	3.2	...	...	...	...	...	...	...	...	...	...	...	...	...	18	6	7	0	4	0	1	0	0	0	O.
3.9	3.4	3.3	3.5	...	...	...	...	...	...	...	...	...	...	...	...	...	17	5	8	0	3	0	5	0	0	0	N.
6.2	7.0	7.2	6.8	...	...	...	...	...	...	...	...	...	...	...	...	...	3	13	15	0	15	2	12	0	0	0	D.
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	Y.

Monthly and yearly meteorological summaries—Continued.

VALENTINE, NEBR.

[Latitude, 42° 50′ N.; longitude, 100° 32′ W.]

Months and year.	Pressure.			Temperature.								Dew point.				Relative humidity.				Precipitation.	
	Mean.	Maximum.	Minimum.	7 a. m.	3 p. m.	10 p. m.	Mean.	Maximum.	Minimum.	Mean. Maximum.	Mean. Minimum.	7 a. m.	3 p. m.	10 p. m.	Mean.	7 a. m.	3 p. m.	10 p. m.	Mean.	Total.	Max. 24 hours.
	In.	In.	In.	°	°	°	°	°	°	°	°	°	°	°	°					In.	In.
J ..	27.154	27.74	26.43	9.4	21.4	14.3	15.0	50	-30	28.8	1.6	5	12	9	8	82	68	80	77	.29	0.09
F ..	27.295	27.79	26.51	5.1	21.1	12.1	12.8	56	-22	26.4	-1.4	-2	9	4	4	72	60	71	68	.41	0.25
M ..	27.331	27.84	26.88	27.8	43.8	35.7	35.8	73	-6	48.8	25.7	16	22	22	20	62	44	60	55	.23	0.18
A ..	27.173	27.58	26.63	38.2	54.8	48.4	47.1	89	14	60.1	35.4	25	32	32	30	65	47	58	57	2.52	1.06
M ..	27.237	27.71	26.69	51.5	69.9	62.0	61.1	88	22	75.2	47.1	42	42	44	43	74	41	54	56	2.60	1.41
J ..	27.233	27.54	27.02	61.5	76.8	70.1	69.5	94	40	81.0	57.2	53	53	55	51	76	46	60	61	3.89	2.00
J ..	27.302	27.50	27.05	63.1	79.8	74.1	72.3	97	38	85.0	50.7	56	54	56	55	79	46	55	60	2.53	1.00
A ..	27.281	27.56	27.01	59.7	74.6	67.6	67.3	96	38	78.8	48.5	55	55	56	55	85	54	60	69	2.94	1.02
S ..	27.339	27.69	26.94	52.5	70.5	61.7	61.6	93	32	74.0	50.3	46	47	48	47	80	48	63	64	1.36	1.02
O ..	27.345	27.75	26.81	34.9	55.1	43.8	44.6	87	3	57.8	31.5	28	28	31	29	77	41	63	61	.57	0.28
N ..	27.319	27.65	26.74	23.4	46.2	32.2	33.9	75	-32	50.3	19.0	14	16	19	16	73	39	62	58	.13	0.13
D ..	27.265	27.68	26.74	14.7	26.9	18.3	20.0	52	-29	31.4	8.3	9	15	11	11	78	63	74	72	.53	0.35
Y ..	27.273	27.84	26.43	36.8	53.4	45.0	45.1	97	-32	58.1	31.2	29	32	32	31	75	50	64	63	18.00	...

VICKSBURG, MISS.

[Latitude, 32° 22′ N.; longitude, 90° 53′ W.]

J ..	29.911	30.39	29.20	39.2	53.3	46.6	46.4	76	10	56.8	36.4	33	33	34	33	78	51	65	65	3.62	1.41
F ..	29.946	30.29	29.42	55.2	63.8	58.7	59.2	80	38	68.2	51.4	50	49	49	49	84	61	73	73	4.13	2.53
M ..	29.842	30.19	29.61	52.7	67.3	61.1	60.4	80	37	70.1	50.9	45	46	46	45	76	49	58	61	2.77	1.13
A ..	29.831	30.14	29.29	57.3	75.5	67.1	66.6	92	43	77.8	55.1	49	50	52	50	76	43	59	59	0.75	0.67
M ..	29.760	29.95	29.54	68.0	82.4	74.2	74.9	91	58	84.7	65.5	64	64	65	64	87	56	74	72	5.40	1.61
J ..	29.748	29.90	29.55	72.7	86.4	76.9	78.7	97	64	88.8	69.7	68	68	68	68	85	56	75	72	2.99	1.05
J ..	29.793	29.98	29.62	74.6	86.3	78.8	79.9	95	68	89.7	72.8	72	74	73	73	92	67	84	81	4.11	1.03
A ..	29.744	29.89	29.56	73.2	88.1	78.3	79.9	95	64	89.7	71.7	70	70	71	71	89	57	80	76	2.44	1.62
S ..	29.801	29.95	29.40	67.9	81.6	75.3	75.9	96	52	86.5	67.1	64	66	66	66	88	56	74	73	4.55	2.45
O ..	29.855	30.08	29.54	55.2	70.5	62.0	62.6	88	34	72.5	53.7	52	56	55	54	90	62	80	77	2.99	1.33
N ..	29.910	30.30	29.63	49.0	65.5	56.7	57.1	81	27	68.2	46.4	44	45	45	45	84	51	66	67	1.43	1.19
D ..	29.862	30.43	29.31	42.2	50.2	46.5	46.3	73	22	53.4	39.8	38	41	41	40	87	74	82	81	7.07	1.57
Y ..	29.834	30.43	29.29	58.9	72.8	65.2	65.6	97	10	75.5	56.7	54	55	55	55	85	57	72	71	42.25	.....

WALLA WALLA, WASH.

[Latitude, 46° N.; longitude, 118° 20′ W.]

J ..	28.898	29.34	28.22	39.5	43.2	40.2	41.0	57	20	48.3	34.9	30	30	31	31	71	61	72	68	2.36	0.74
F ..	28.940	29.23	28.39	19.9	25.3	23.7	23.0	67	-3	30.1	16.4	16	17	17	17	87	75	81	81	1.78	0.40
M ..	29.007	29.43	28.54	44.3	53.7	50.7	49.6	72	21	59.5	40.7	33	34	36	34	66	50	59	58	1.83	0.40
A ..	28.916	29.35	28.34	44.5	55.3	54.6	51.5	81	29	63.0	41.8	35	32	34	34	71	45	49	55	1.57	0.38
M ..	28.916	29.26	28.52	51.2	65.9	65.6	60.9	99	37	72.8	48.8	37	35	40	37	61	35	43	46	1.08	0.61
J ..	28.871	29.21	38.56	53.4	69.6	68.8	63.9	96	44	76.2	51.8	42	38	44	41	66	35	45	49	2.12	0.69
J ..	28.917	29.10	28.74	62.5	81.9	82.0	75.5	98	48	88.8	60.6	44	44	44	44	52	27	29	36	0.63	0.03
A ..	28.840	29.14	28.57	60.7	77.9	77.9	72.2	98	44	85.6	58.9	44	46	46	45	56	34	35	42	0.71	0.68
S ..	28.928	29.18	28.60	53.4	66.2	64.0	61.2	84	38	73.8	50.7	43	45	46	45	70	48	56	58	1.55	0.64
O ..	29.085	29.43	28.59	45.7	57.5	52.5	51.9	72	24	62.7	41.8	38	40	42	40	77	55	69	67	1.52	0.72
N ..	29.040	29.47	28.65	37.4	43.9	41.2	40.8	68	13	49.2	34.2	32	35	35	34	82	73	81	79	3.06	1.31
D ..	28.959	29.57	28.24	37.5	42.0	40.2	39.9	63	20	46.8	33.4	29	30	31	30	75	65	73	71	2.83	0.86
Y ..	28.943	29.57	28.22	45.8	56.9	55.1	52.6	99	-3	63.1	42.8	35	36	37	36	69	50	58	59	20.44	.....

WASHINGTON CITY.

[Latitude, 38° 54′ H; longitude, 77° 3′ N. W.]

J ..	29.968	30.56	29.38	28.6	37.9	32.2	32.9	67	6	41.3	23.5	23	22	23	23	78	56	69	68	2.39	0.98
F ..	30.126	30.80	29.31	35.2	43.4	38.1	38.9	73	19	47.7	31.8	28	30	28	29	78	63	71	71	3.42	0.69
M ..	29.897	30.62	29.39	33.3	44.2	38.1	38.5	65	21	46.7	30.8	24	24	25	24	70	48	61	60	3.83	1.54
A ..	29.916	30.53	29.24	45.3	58.6	50.8	51.6	84	28	61.3	42.1	37	37	37	37	74	48	63	62	3.24	1.01
M ..	29.927	30.23	29.53	62.3	76.0	65.4	67.9	89	50	78.2	58.0	56	55	57	56	80	51	77	69	2.50	0.76
J ..	29.912	30.24	29.54	66.6	79.5	70.1	72.1	95	50	81.1	61.8	59	59	61	60	78	52	74	68	2.99	1.58
J ..	29.877	30.10	29.62	75.7	87.6	78.1	80.5	103	64	89.1	71.7	69	69	71	70	81	56	79	72	3.29	1.16
A ..	29.889	30.19	29.62	68.5	79.9	71.1	73.2	92	51	82.0	64.6	63	62	64	63	82	57	79	73	2.34	1.41
S ..	30.015	30.32	29.56	59.1	72.3	63.6	65.0	90	40	74.3	56.7	53	54	58	55	82	54	82	73	3.12	0.88
O ..	29.950	30.36	29.46	50.2	62.4	53.6	55.4	85	31	64.8	46.8	42	41	44	42	76	50	72	66	1.82	1.14
N ..	29.994	30.70	29.36	39.1	51.7	43.9	44.9	70	23	53.8	36.8	31	31	30	30	74	47	60	60	1.83	0.76
D ..	30.038	30.81	29.83	33.5	42.2	36.0	37.2	59	14	43.7	29.9	27	27	28	27	78	58	74	70	4.31	0.92
Y ..	29.959	30.81	29.24	49.8	61.3	53.4	54.8	103	6	63.7	46.2	42	42	44	43	78	53	72	68	35.08	.....

Monthly and yearly meteorological summaries—Continued.

VALENTINE, NEBR.

[H=2,614. T=37. h=8.]

Cloudiness (in tenths).				Wind.													Number of days—										
7 a. m.	3 p. m.	10 p. m.	Mean.	Total (miles).	Maximum.	Direction.	Prevailing direction.	North.	Northeast.	East.	Southeast.	South.	Southwest.	West.	Northwest.	Calms.	Clear.	Fair.	Cloudy.	Foggy.	Rain or snow.	Max. below 32°.	Min. below 32°.	Max. above 90°.	Thunder-storms.	Auroras.	Months and year.
3.3	6.0	3.8	4.4	9,068	44	SW.	SW.	14	3	5	4	5	26	12	21	3	8	18	5	0	9	14	31	0	0	0	J.
3.6	4.1	3.4	3.7	8,890	63	N.	N.	20	2	4	8	10	15	10	13	2	16	5	7	0	4	16	28	0	0	0	F.
5.5	4.7	3.2	4.5	11,345	65	NW.	N.	16	11	9	8	15	11	10	13	0	13	11	7	0	2	5	20	0	0	0	M.
5.4	6.3	4.4	5.4	10,340	58	N.	NW.	10	6	13	9	10	6	7	29	0	7	17	6	0	9	0	11	0	2	0	A.
3.5	3.9	2.5	3.3	10,553	66	NW.	NW.	9	9	4	11	21	9	8	22	0	17	10	4	0	8	0	2	0	2	0	M.
5.8	3.5	4.0	4.4	9,548	72	SW.	S.	10	5	8	18	28	4	7	9	1	7	20	3	0	10	0	0	4	4	0	J.
3.9	4.3	3.9	4.0	7,086	70	NW.	S.	10	12	12	13	24	6	3	12	1	10	19	2	0	11	0	0	6	6	0	J.
5.3	5.3	4.7	5.1	7,698	48	NW. SE. N.	SE.	13	8	13	21	19	8	2	6	3	8	15	8	0	13	0	0	3	5	0	A.
4.5	4.6	3.4	4.2	8,867	48	NW., S	S.	17	8	7	10	24	6	6	5	7	15	8	7	0	6	0	1	1	0	0	S.
2.9	5.0	2.6	3.6	9,169	54	SW., N.	W.	12	5	2	7	8	13	23	22	1	16	9	6	0	6	1	12	0	0	0	O.
3.4	5.0	3.1	3.8	7,648	64	NW.	NW.	11	1	6	6	9	15	17	24	1	14	11	5	0	1	8	23	0	0	0	N.
5.2	5.1	4.6	5.0	8,900	48	NW.	NW.	10	0	6	4	7	10	18	34	3	8	14	8	0	6	13	31	0	0	0	D.
4.4	4.8	3.6	4.3	109,022	..	.....	NW.	152	70	89	119	180	129	123	210	22	139	157	68	0	85	57	159	14	19	0	Y.

VICKSBURG, MISS.

[H=222. T=60. h=54.]

5.2	4.4	3.1	4.2	6,611	44	SW.	SW.	13	11	4	14	17	18	6	8	2	12	13	6	0	10	2	13	0	3	0	J.
7.0	6.8	5.5	6.4	5,315	30	NW.	S.	7	12	7	13	17	12	5	9	2	6	8	14	0	13	0	0	0	3	0	F.
3.4	3.7	2.3	3.1	5,231	26	NW.	SW.	14	7	9	11	15	16	7	10	4	18	9	4	0	6	0	0	0	3	0	M.
3.1	3.5	1.7	2.8	4,898	42	W.	SE.	5	10	4	23	19	11	6	8	4	18	9	3	0	4	0	0	1	1	0	A.
4.7	5.3	3.4	4.5	3,532	24	NW.	W., SW	2	3	4	12	11	16	16	7	22	13	12	6	0	11	0	0	2	4	0	M.
3.7	4.8	3.2	3.9	3,333	42	W.	SE.	10	9	9	16	9	6	5	10	16	13	12	5	0	14	0	0	14	3	0	J.
4.5	6.5	4.1	5.0	3,092	26	W.	SE.	5	2	2	16	11	11	15	11	20	10	14	7	0	14	0	0	16	8	0	J.
4.1	4.8	2.7	3.9	2,861	30	N.	NW.	10	4	11	10	4	10	10	15	19	13	15	3	0	8	0	0	17	4	0	A.
3.0	4.9	1.8	3.2	3,520	28	SE.	SE, NW	6	6	10	17	5	7	10	17	12	15	13	2	0	7	0	0	13	1	0	S.
4.0	4.9	3.7	4.2	4,074	21	N.	NE.	18	25	5	11	10	2	3	8	11	14	9	8	0	7	0	0	0	0	0	O.
4.3	4.7	4.5	4.5	3,605	27	N.	S.	13	11	4	8	18	10	6	4	16	13	7	10	0	6	0	4	0	0	0	N.
7.4	8.0	7.4	7.6	4,997	36	W.	SE.	14	14	10	20	6	3	15	7	4	4	6	21	0	19	0	8	0	1	0	D.
4.5	5.2	3.6	4.4	51,159	..	.....	SE.	117	114	79	171	142	122	104	114	132	149	127	89	0	119	2	25	63	31	0	Y.

WALLA WALLA, WASH.

[H=1,018. T=66. h=57.]

6.5	7.9	7.6	7.3	8,814	45	SW.	SW.	4	0	1	3	9	73	3	0	0	2	14	15	0	16	0	7	0	0	0	J.
7.1	6.8	7.5	7.1	3,323	28	SW.	SW.	3	1	0	2	13	45	9	2	9	2	12	14	0	16	15	24	0	0	0	F.
5.5	6.0	5.2	5.6	5,428	45	SW.	SW.	4	1	3	0	21	38	13	2	11	8	11	12	0	12	0	4	0	0	0	M.
7.0	6.5	6.6	6.7	5,965	30	S., SW.	SW.	5	4	0	5	16	46	8	4	2	3	12	15	0	11	0	2	0	0	0	A.
4.9	4.0	3.5	4.1	4,827	35	SW.	SW.	14	4	3	5	18	31	13	4	1	15	6	10	0	8	0	0	2	0	0	M.
4.2	4.7	5.1	4.7	4,449	28	SW.	SW.	5	6	1	8	17	38	7	4	4	9	13	8	0	10	0	0	2	0	0	J.
1.5	.7	1.9	1.4	3,701	24	SW.	SW.	6	3	3	6	15	25	15	6	14	27	2	2	0	1	0	0	15	3	0	J.
2.1	2.3	3.1	2.5	4,182	25	SW.	SW.	6	4	3	7	24	32	12	5	0	19	9	3	0	4	0	0	8	1	0	A.
2.6	4.3	3.3	3.4	3,616	26	SW.	SW.	5	3	3	9	28	30	7	3	2	15	11	4	0	7	0	0	0	1	0	S.
3.5	4.1	2.8	3.5	3,364	36	SW.	SW.	2	3	4	10	24	38	9	2	1	16	12	3	0	7	0	2	0	0	0	O.
4.9	6.0	4.7	5.5	2,978	30	SW.	SW.	1	2	0	8	24	37	11	3	4	7	14	9	0	10	4	15	0	0	0	N.
6.1	7.5	7.1	6.9	6,054	36	SW.	SW.	0	0	1	8	19	56	7	2	0	6	8	17	0	13	0	14	0	0	0	D.
4.7	5.1	4.9	4.9	56,701	..	.....	SW.	55	31	22	71	228	489	114	37	48	129	124	112	0	115	19	68	27	5	0	Y.

WASHINGTON CITY.

[H=106. T=58. h=51.]

5.4	5.5	4.0	5.0	4,761	28	NW.	S.	14	4	5	3	27	11	2	23	4	11	14	6	0	9	10	23	0	0	0	J.
6.0	6.5	5.4	6.0	4,302	33	NW.	NW.	10	10	7	2	15	10	3	20	7	5	14	9	0	13	1	16	0	0	0	F.
6.3	6.4	4.7	5.8	6,337	27	NW.	NW.	12	10	11	5	6	3	2	38	6	6	14	11	0	14	0	21	0	1	0	M.
4.8	5.6	4.3	4.9	4,984	32	NW.	NW.	10	6	7	5	20	10	6	22	4	10	12	8	0	14	0	4	0	3	0	A.
5.2	5.1	3.7	4.7	3,131	24	NW.	S.	7	13	13	7	29	5	3	5	11	10	13	8	0	10	0	0	0	7	0	M.
5.4	4.8	3.9	4.7	3,377	18	E.	S.	13	12	8	6	18	12	5	8	8	10	12	8	0	10	0	0	3	9	0	J.
5.9	5.5	4.0	5.1	3,531	35	N.	S.	4	3	7	9	25	16	7	11	11	8	15	8	0	9	0	0	11	11	0	J.
5.9	5.5	4.0	5.1	3,156	35	NW.	N.	22	9	5	7	20	6	2	6	16	7	17	7	0	13	0	0	3	5	0	A.
5.0	6.5	4.3	5.3	3,057	24	N.	S.	17	12	8	5	19	6	2	4	17	8	14	8	0	12	0	0	0	1	0	S.
5.4	5.2	5.5	5.4	4,127	24	NW, N.	N.	30	5	1	0	13	5	2	18	19	10	11	10	0	11	0	1	0	0	0	O.
4.1	4.4	2.3	3.6	3,995	30	NW.	NW.	12	4	3	3	20	4	6	28	10	13	14	3	0	7	0	9	0	0	0	N.
6.3	4.7	6.3	5.8	4,498	33	W, NW	NW.	13	9	7	8	11	4	11	27	3	5	15	11	0	11	4	19	0	0	0	D.
5.5	5.5	4.4	5.1	49,256	..	.....	S.	164	97	82	60	223	92	51	210	116	103	165	97	0	133	15	93	17	37	0	Y.

Monthly and yearly meteorological summaries—Continued.

WHIPPLE BARRACKS, PRESCOTT, ARIZ.

[Latitude, 34° 33′ N.; longitude, 112° 28′ W.]

Months and year.	Pressure.			Temperature.								Dew point.				Relative humidity.				Precipitation.	
	Mean.	Maximum.	Minimum.	7 a. m.	3 p. m.	10 p. m.	Mean.	Maximum.	Minimum.	Mean. Maximum.	Mean. Minimum.	7 a. m.	3 p. m.	10 p. m.	Mean.	7 a. m.	3 p. m.	10 p. m.	Mean.	Total.	Max. 24 hours.
	In.	In.	In.	°	°	°	°	°	°	°	°	°	°	°	°					In.	In.
J..	24.742	24.97	24.47	25.5	49.4	37.4	37.4	63	11	53.6	23.5	19	20	23	21	76	31	56	54	T.	T.
F..	24.682	25.05	24.46	29.9	44.6	37.9	37.5	71	12	49.0	26.4	24	27	28	26	76	54	67	66	3.12	1.96
M..	24.784	24.95	24.55	33.7	63.0	53.1	49.9	76	23	66.8	31.7	26	31	34	30	73	32	50	51	T.	T.
A..	24.679	24.89	24.46	37.3	59.5	52.2	49.7	79	23	63.6	36.0	31	40	39	37	78	52	64	65	2.57	1.46
M..	24.710	24.96	24.51	43.7	71.3	62.9	59.3	87	30	75.6	41.9	36	47	46	43	74	43	55	57	.43	.22
J..	24.680	24.84	24.56	52.9	82.0	73.6	69.5	97	36	85.4	50.7	44	56	56	52	72	43	57	58	.57	.43
J..	24.827	24.94	24.72	60.3	82.1	75.1	72.5	94	48	86.5	58.5	53	60	61	58	79	51	63	64	2.64	.87
A..	24.747	24.88	24.64	59.3	80.5	73.5	71.1	93	50	84.9	57.9	53	59	60	57	80	51	64	65	.71	.23
S..	24.784	21.88	24.61	54.0	75.9	66.6	65.5	87	46	78.4	53.2	51	56	58	55	85	52	74	70	4.88	3.14
O..	24.753	25.00	24.17	41.6	66.5	55.1	54.4	85	29	69.3	39.0	36	41	43	40	82	41	66	63	.03	.05
N..	24.769	24.92	24.42	32.8	57.7	48.7	44.7	73	20	60.9	31.1	28	33	35	32	84	43	72	66	1.57	.60
D..	24.708	24.93	24.41	23.7	40.2	31.2	31.7	57	8	43.8	21.0	19	23	24	22	84	52	77	71	0.82	.41
Y..	24.739	25.05	24.17	41.2	64.4	55.2	53.6	97	8	68.2	39.2	35	41	42	39	78	45	64	62	17.36	.....

WILMINGTON, N. C.

[Latitude, 34° 14′ N.; longitude, 77° 57′ W.]

J..	30.091	30.55	29.64	39.1	50.9	42.6	44.2	73	15	53.4	34.1	34	36	36	36	84	59	78	74	3.30	.70
F..	30.194	30.66	29.71	50.6	60.4	53.1	54.7	75	27	64.4	45.3	47	50	49	48	87	70	86	81	1.61	.46
M..	29.942	30.47	29.51	44.9	60.9	50.4	52.1	82	28	63.1	40.7	39	41	41	40	80	50	72	67	1.48	1.00
A..	29.998	30.46	29.50	54.3	67.6	57.7	59.9	86	33	69.8	49.3	47	48	49	48	78	52	76	68	3.96	1.30
M..	29.965	30.28	29.65	66.9	77.6	68.8	71.1	88	47	79.8	61.6	61	61	63	62	81	58	84	74	5.62	1.66
J..	29.956	30.23	29.70	71.8	81.9	73.2	75.6	98	53	84.4	66.9	65	63	66	65	79	56	79	71	6.41	1.83
J..	29.966	30.18	29.79	78.4	85.5	78.7	80.9	100	66	88.7	74.1	74	75	75	74	85	72	88	82	6.77	3.45
A..	29.917	30.14	29.48	74.2	82.8	75.4	77.5	95	56	84.7	70.3	71	77	73	74	90	83	91	88	9.88	5.11
S..	30.048	30.24	29.67	66.7	77.8	69.2	71.2	91	42	79.8	61.9	61	65	64	64	83	66	84	78	.46	.25
O..	29.978	30.30	29.62	57.7	70.0	60.5	62.7	85	35	71.7	53.0	53	57	55	55	84	65	84	78	6.53	1.84
N..	30.064	30.52	29.59	45.8	60.6	49.4	51.9	74	26	62.7	40.8	40	46	44	44	81	59	83	74	1.04	.52
D..	30.060	30.55	29.36	43.0	54.2	47.2	48.1	67	19	56.4	38.9	37	42	41	40	80	66	80	75	4.41	1.66
Y..	30.015	30.66	29.36	57.8	69.2	60.5	62.5	100	15	71.6	53.1	52	55	55	54	83	63	82	76	51.47	.....

WINNEMUCCA, NEV.

[Latitude, 40° 58′ N.; longitude, 117° 43′ W.]

J..	25.663	25.95	25.21	29.4	40.4	34.7	34.8	57	8	45.2	24.2	20	20	20	20	69	45	56	57	.51	.19
F..	25.486	26.04	25.08	24.1	33.9	28.9	29.0	51	1	38.7	19.9	16	20	19	19	72	57	67	65	1.55	.49
M..	25.713	25.94	25.46	33.8	55.5	47.4	45.6	75	18	60.2	29.8	22	16	20	19	61	25	37	41	.40	.29
A..	25.579	25.90	25.22	35.4	53.8	47.6	45.6	81	22	59.5	32.2	25	19	21	22	69	32	40	47	1.94	.70
M..	25.600	25.88	25.31	41.7	67.8	60.3	56.6	96	17	72.5	39.4	26	22	27	25	56	19	33	36	.36	.14
J..	25.543	25.77	25.17	48.8	71.0	67.3	62.4	98	30	77.6	46.4	32	33	34	33	57	29	34	40	1.14	.40
J..	25.639	25.78	25.47	55.4	83.3	77.8	72.2	95	44	88.1	52.6	33	38	37	36	45	21	25	30	.09	.05
A..	25.550	25.72	25.30	52.3	81.7	71.9	68.6	93	26	85.6	48.3	25	28	27	27	38	15	21	24	.13	.13
S..	25.636	25.86	25.40	44.9	72.8	62.9	60.2	88	28	78.1	40.1	26	30	26	27	49	25	29	34	.35	.16
O..	25.752	26.03	25.37	35.6	64.1	51.3	50.3	87	18	68.7	30.0	25	27	23	25	67	26	34	42	T.	T.
N..	25.719	25.99	25.39	23.7	50.4	38.1	37.4	71	-3	55.0	19.4	16	24	21	20	77	38	54	57	.03	.03
D..	25.726	26.07	25.06	21.1	34.0	28.8	28.0	48	1	38.8	15.6	18	22	22	21	90	64	76	77	1.55	.67
Y..	25.634	26.07	25.06	37.2	59.1	51.4	49.2	98	-3	64.0	33.2	24	25	25	24	63	38	42	46	8.05	.....

WOODS HOLL, MASS.

[Latitude, 41° 33′ N.; longitude, 70° 40′ W.]

J..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
F..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
M..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
A..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
M..	30.080	30.40	29.62	52.1	60.6	52.4	55.0	75	42	64.2	49.0	48	50	49	49	85	69	88	81	1.91	.84
J..	30.040	30.32	29.67	59.7	65.2	58.7	61.2	76	47	68.7	55.7	56	58	56	56	87	77	90	85	4.03	1.26
J..	30.003	30.26	29.60	68.5	72.3	68.1	69.6	82	59	75.2	65.8	66	68	66	66	92	86	93	90	2.93	1.52
A..	29.985	30.30	29.70	65.5	70.2	66.0	67.2	82	55	72.7	62.7	62	63	62	62	90	79	87	85	10.84	6.92
S..	30.096	30.47	29.60	58.6	62.9	59.5	60.3	75	49	65.5	56.2	55	56	55	55	88	79	85	84	1.99	.82
O..	30.017	30.53	29.43	50.7	54.5	52.3	52.5	66	34	58.2	47.4	50	53	51	51	96	94	96	95	2.21	1.04
N..	30.000	30.76	29.32	41.8	46.0	42.6	43.5	61	20	50.3	37.1	41	45	42	43	96	96	98	97	2.84	1.37
D..	30.068	30.89	28.90	33.3	36.8	34.0	34.7	56	8	40.9	28.0	33	36	34	34	100	97	99	98	4.59	1.43
Y..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

Monthly and yearly meteorological summaries—Continued.

WHIPPLE BARRACKS, PRESCOTT, ARIZ.

[H=5,389. T=7. h=3.]

Cloudiness (in tenths).				Wind.													Number of days—										
7 a. m.	3 p. m.	10 p. m.	Mean.	Total (miles).	Maximum.	Direction.	Prevailing direction.	North.	Northeast.	East.	Southeast.	South.	Southwest.	West.	Northwest.	Calms.	Clear.	Fair.	Cloudy.	Foggy.	Rain or snow.	Max. below 32°.	Min. below 32°.	Max. above 90°.	Thunder-storms.	Auroras.	Months and year.
1.9	2.6	1.6	2.0	4,016	34	SW.	SW.	11	16	3	0	4	35	5	2	17	21	9	1	0	0	0	27	0	0	0	J.
1.9	4.1	2.0	2.7	6,390	36	SW.	SW.	3	5	1	1	11	49	0	2	12	17	8	3	0	6	0	21	0	0	0	F.
1.8	2.4	1.5	1.9	4,437	32	SW.	SW.	6	12	1	0	2	41	6	7	18	20	11	0	0	0	0	17	0	1	0	M.
2.6	3.9	3.1	3.2	5,904	35	SW.	SW.	2	8	3	0	4	48	5	8	12	16	9	5	0	8	0	7	0	1	0	A.
2.0	2.7	2.1	2.3	5,727	32	SW.	SW.	0	4	3	7	6	54	2	7	10	21	7	3	0	4	0	1	0	3	0	M.
0.9	2.4	1.9	1.7	5,640	32	SW.	SW.	1	0	2	5	9	56	9	2	6	19	11	0	0	3	0	0	7	6	0	J.
2.8	3.9	2.5	3.1	4,324	30	SW.	SW.	2	3	6	3	6	38	19	6	10	17	10	4	0	10	0	0	10	12	0	J.
1.9	3.6	2.5	2.7	4,912	31	SW.	SW.	3	4	3	1	3	56	5	5	13	21	5	5	0	7	0	0	5	9	0	A.
2.4	3.9	1.8	2.7	3,902	32	SW.	SW.	4	6	4	0	3	41	4	2	26	18	8	4	0	6	0	0	0	7	0	S.
1.3	2.0	1.4	1.6	3,995	37	S.	SW.	9	8	9	6	10	27	4	5	15	26	3	2	0	1	0	3	0	0	0	O.
2.1	3.0	1.8	2.3	2,861	48	SW.	SW.	3	18	6	3	9	23	3	4	21	20	8	2	0	5	0	17	0	0	0	N.
1.4	2.8	2.2	2.1	4,344	48	SW.	NE.	13	20	6	5	8	16	3	5	17	22	6	3	0	5	3	30	0	0	0	D.
1.9	3.1	2.0	2.3	56,452	...	.....	SW.	57	104	47	31	75	484	65	55	177	238	95	32	0	55	3	123	22	39	0	Y.

WILMINGTON, N. C.

[H=52. T=60. h=44.]

4.3	5.0	4.6	4.6	6,164	34	NW.	SW.	12	10	1	1	8	26	14	19	2	11	14	6	0	13	1	16	0	0	0	J.
5.1	7.1	4.2	5.5	5,143	32	SW.	SW.	5	15	10	7	6	20	8	7	6	8	11	9	0	13	0	3	0	0	0	F.
4.0	4.0	3.0	3.7	5,903	25	SW.	SW.	10	9	4	5	6	24	13	22	0	15	11	5	0	6	0	3	0	1	0	M.
2.7	4.2	2.6	3.2	6,029	30	S.	S.	4	12	12	5	22	8	14	8	5	18	8	4	0	8	0	0	0	4	0	A.
4.4	5.1	3.1	4.2	4,402	20	E.	SW.	5	4	3	14	19	29	3	9	7	11	14	6	0	14	0	0	0	7	0	M.
4.5	5.1	4.1	4.6	5,190	23	SW.	SW.	4	22	12	6	3	38	4	0	1	11	11	8	0	13	0	0	5	4	0	J.
4.3	6.3	4.6	5.1	4,834	34	SE.	SW.	2	0	0	11	4	55	15	5	1	11	11	9	0	17	0	0	11	5	0	J.
3.6	5.6	3.5	4.2	5,115	28	NE.	SW.	7	10	15	9	4	22	18	7	1	11	16	4	0	14	0	0	5	4	0	A.
2.7	4.6	3.0	3.4	4,371	18	NE., SW.	SW.	9	17	10	12	6	23	10	0	3	12	15	3	0	7	0	0	1	1	0	S.
5.2	4.7	4.6	4.8	4,715	22	NW.	NE.	15	30	2	3	2	14	9	13	5	14	5	12	0	10	0	0	0	0	0	O.
2.6	2.9	1.2	2.2	3,879	23	W.	N.	21	12	6	0	9	13	8	16	5	19	9	2	0	6	0	3	0	1	0	N.
4.9	6.3	4.5	5.2	4,837	36	W.	NE.	13	29	12	5	6	3	6	16	3	9	11	11	0	13	0	7	0	0	0	D.
4.0	5.1	3.6	4.2	60,582	...	.....	SW.	107	170	87	78	95	275	122	122	39	150	136	79	0	134	1	32	22	27	0	Y.

WINNEMUCCA, NEV.

[H=4,358. T=16. h=5.]

4.1	4.6	4.1	4.3	8,543	47	SW.	SW.	2	12	3	0	2	66	4	3	1	12	13	6	0	6	0	23	0	0	0	J.
5.4	6.6	5.0	5.7	7,354	40	NW.	SW.	4	19	2	0	2	54	2	4	0	7	11	10	0	15	6	27	0	0	0	F.
2.6	3.3	2.9	2.9	6,475	44	SW.	SW.	1	24	4	1	7	42	8	4	2	18	10	3	0	4	0	19	0	0	0	M.
3.9	5.4	3.7	4.3	6,552	38	SW.	SW.	3	21	2	1	5	40	6	11	1	12	12	6	0	8	0	12	0	0	0	A.
1.7	2.9	3.8	2.8	6,919	44	W.	SW.	3	28	3	4	1	38	5	9	2	17	12	2	0	5	0	6	3	3	0	M.
2.1	2.8	3.7	2.9	5,599	40	NW.	NE.	12	27	3	1	7	26	9	5	0	17	12	1	0	7	0	1	5	1	0	J.
1.0	.9	2.7	1.5	5,348	38	W.	SW.	4	18	4	2	5	46	12	2	0	24	5	2	0	3	0	0	9	2	0	J.
.9	.9	1.4	1.1	5,601	44	W.	W.	6	12	18	2	5	15	22	12	1	25	6	0	0	1	0	1	6	1	0	A.
1.7	2.2	1.8	1.9	5,219	34	W.	E.	4	7	28	6	7	9	25	4	0	23	4	3	0	4	0	4	0	2	0	S.
1.0	1.3	1.1	1.1	5,046	24	W., NW., NE.	E.	13	19	21	4	3	9	14	10	0	29	2	0	0	0	0	19	0	0	0	O.
1.7	2.8	2.1	2.2	4,891	30	W., N.	E.	10	16	23	3	6	9	17	6	0	19	11	0	0	1	2	27	0	0	0	N.
3.5	5.6	4.1	4.4	5,764	39	W.	W.	10	13	12	9	3	16	27	3	0	10	15	6	0	10	7	30	0	0	0	D.
2.5	3.3	3.0	2.9	73,311	...	.....	SW.	72	216	123	33	53	370	151	70	7	213	113	39	0	64	15	169	23	9	0	Y.

WOODS HOLL, MASS.

[H=22. T=51. h=39.]

...	...	...	...	.....	...	.....	.....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	J.
...	...	...	...	.....	...	.....	.....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	F.
...	...	...	...	.....	...	.....	.....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	M.
...	...	...	...	.....	...	.....	.....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	A.
4.0	4.7	3.6	4.1	6,862	28	SW.	SW.	10	19	3	17	12	26	2	4	0	15	9	7	0	6	0	0	0	3	0	M.
3.2	4.2	3.7	3.7	7,895	35	SW.	SW.	4	11	8	14	8	38	2	4	1	11	17	2	0	11	0	0	0	2	0	J.
5.4	4.9	3.2	4.5	8,520	36	SW.	SW.	9	3	5	15	16	33	9	3	0	10	13	8	0	7	0	0	0	2	0	J.
4.8	5.3	3.2	4.4	8,425	45	SW.	SW.	18	11	2	13	16	20	5	7	1	11	15	5	0	11	0	0	0	2	0	A.
4.6	6.3	3.8	4.9	10,122	...	.....	SW.	17	2	4	2	6	32	14	13	0	11	10	9	0	8	0	0	0	0	0	S.
5.7	6.4	6.0	6.0	10,923	...	.....	W.	14	11	3	4	9	19	22	10	0	6	12	12	0	7	0	0	0	0	0	O.
4.8	4.9	3.0	4.2	10,505	...	.....	W.	3	5	2	8	4	12	18	15	0	8	11	3	0	8	1	2	0	0	0	N.
6.5	7.0	4.7	6.1	12,336	...	.....	NW.	8	10	14	11	2	5	20	22	1	6	13	12	0	13	5	20	0	0	0	D.
...	...	...	...	.....	...	.....	.....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	Y.

Monthly and yearly meteorological summaries—Continued.

YANKTON, DAK.

[Latitude, 42° 54′ N.; longitude, 97° 28′ W.]

Months and year.	Pressure.			Temperature.								Dew point.				Relative humidity.				Precipitation.	
	Mean.	Maximum.	Minimum.	7 a. m.	3 p. m.	10 p. m.	Mean.	Maximum.	Minimum.	Mean. Maximum.	Mean. Minimum.	7 a. m.	3 p. m.	10 p. m.	Mean.	7 a. m.	3 p. m.	10 p. m.	Mean.	Total.	Max. 24 hours.
	In.	In.	In.	°	°	°	°	°	°	°	°	°	°	°	°					In.	In.
J..	28.641	29.32	27.82	2.7	12.2	8.6	7.8	47	-29	20.0	- 3.7	- 3	4	3	1	75	71	77	74	.43	.13
F..	28.785	29.44	27.76	5.7	16.6	11.7	11.3	50	-22	22.1	0.4	- 0	8	6	5	77	70	77	75	.64	.56
M..	28.753	29.35	28.11	27.5	41.5	34.1	34.4	78	- 2	45.9	24.9	22	32	28	27	79	69	77	75	.26	.09
A..	28.544	28.97	27.99	42.4	59.2	51.1	50.9	90	19	64.2	40.3	36	42	41	40	80	57	71	69	2.45	1.13
M..	28.593	29.06	27.91	52.5	73.8	64.3	63.5	90	36	77.2	50.6	47	53	52	50	82	50	66	66	1.28	.89
J..	28.597	28.83	28.33	62.9	77.9	71.7	70.8	94	45	82.0	61.1	59	62	62	61	86	50	72	72	2.48	.60
J..	28.640	28.84	28.46	65.0	83.0	75.1	74.4	98	53	86.0	63.6	61	65	66	64	88	56	76	73	5.00	1.32
A..	28.643	28.87	28.39	61.4	75.8	69.5	68.9	90	44	80.7	59.9	58	62	62	60	88	64	78	77	4.46	1.15
S..	28.706	29.07	28.20	54.5	70.0	61.6	62.0	91	35	74.2	52.9	52	58	56	55	90	67	84	80	6.70	2.14
O..	28.711	29.21	28.14	38.7	56.1	45.5	46.8	80	13	59.1	36.0	33	39	35	36	82	54	68	68	.74	.65
N..	28.716	29.11	28.17	27.7	43.9	34.3	35.3	78	-18	48.6	24.1	20	28	24	24	75	58	67	77	.57	.46
D..	28.694	29.30	28.15	13.9	20.4	17.2	17.2	45	-16	26.7	8.0	9	14	12	12	80	77	80	79	2.07	.57
Y..	28.669	29.44	27.76	37.9	52.5	45.4	45.3	99	-29	57.2	34.8	33	39	37	36	82	62	74	73	27.08	.....

YUMA, ARIZ.

[Latitude, 32° 45′ N.; longitude, 114° 36′ W.]

J..	29.936	30.21	29.62	46.5	65.0	55.4	55.6	76	30	68.2	42.4	30	35	36	34	56	35	50	47	.00	.....
F..	29.908	30.27	29.59	47.0	63.8	57.5	56.1	83	35	67.2	43.4	38	40	41	40	73	43	55	57	T.	T.
M..	29.852	30.13	29.66	55.8	81.2	72.8	69.9	92	43	85.0	53.3	49	56	57	54	79	42	59	60	.00	.....
A..	29.769	29.94	29.59	56.8	80.6	72.1	69.8	97	44	84.4	55.0	51	59	58	56	83	49	62	64	.20	.20
M..	29.707	30.02	29.53	62.0	87.9	81.6	77.2	104	44	92.1	59.5	54	66	62	61	76	48	53	59	T.	T.
J..	29.572	29.74	29.38	71.2	96.0	90.4	85.9	116	59	101.6	69.4	58	57	59	58	64	30	37	43	.01	.01
J..	29.680	29.84	29.54	79.3	101.9	94.8	92.0	114	66	106.2	75.7	66	65	66	65	61	31	40	45	T.	T.
A..	29.589	29.73	29.45	78.3	100.2	94.1	90.9	112	60	104.9	74.3	68	67	65	67	72	36	40	49	T.	T.
S..	29.656	29.78	29.43	72.8	94.8	86.5	84.7	105	62	99.1	69.8	65	64	65	65	77	40	51	56	1.09	1.09
O..	29.733	29.97	29.25	65.0	86.5	75.9	75.8	108	48	90.2	60.8	51	54	54	53	64	34	47	48	.02	.02
N..	29.842	30.13	29.62	53.6	74.5	63.7	63.9	91	38	78.5	56.0	43	47	48	46	71	41	60	57	2.43	1.71
D..	29.941	30.16	29.57	45.2	61.5	52.5	53.1	72	27	64.8	41.3	34	38	37	36	68	43	58	56	.15	.15
Y..	29.966	30.27	29.25	61.1	82.8	74.8	72.9	116	27	86.8	57.9	50	54	54	53	70	39	51	54	3.90	.....

Monthly and yearly meteorological summaries—Continued.

YANKTON, DAK.

[H=1,234. T=35. h=26.]

Cloudiness (in tenths).				Wind.													Number of days—										
7 a. m.	3 p. m.	10 p. m.	Mean.	Total (miles).	Maximum.	Direction.	Prevailing direction.	North.	Northeast.	East.	Southeast.	South.	Southwest.	West.	Northwest.	Calms.	Clear.	Fair.	Cloudy.	Foggy.	Rain or snow.	Max. below 32°.	Min. below 32°.	Max. above 90°.	Thunder-storms.	Auroras.	Months and year.
3.2	5.0	2.9	3.7	5,514	38	NW.	NW.	16	4	4	7	11	6	13	26	6	13	14	4	0	8	20	31	0	0	0	J.
4.8	5.9	4.0	4.9	6,362	40	NW.	NW.	7	3	7	14	11	8	5	23	11	8	13	7	0	6	19	28	0	0	0	F.
5.3	6.4	2.8	4.8	6,791	46	NW.	NW.	12	13	5	8	12	7	8	24	4	8	17	6	0	6	3	25	0	0	0	M.
5.7	6.5	3.8	5.3	8,239	46	S.	NW.	15	7	5	10	17	5	3	25	3	6	16	8	0	9	0	6	1	1	0	A.
4.4	3.9	2.7	3.7	7,565	40	NW.	S.	17	3	3	16	24	4	6	17	3	16	9	6	0	5	0	0	1	3	0	M.
4.4	5.3	3.7	4.5	5,874	28	SE.	S.	4	6	11	21	30	3	4	10	1	11	13	6	0	8	0	0	4	3	0	J.
4.1	4.2	3.0	3.8	4,775	54	NW.	S.	10	4	8	9	23	10	2	21	6	10	20	1	0	13	0	0	8	12	0	J.
4.6	5.5	4.6	4.9	4,468	48	S.	S.	10	8	14	13	18	7	1	12	10	11	14	6	0	14	0	0	6	7	0	A.
5.1	4.9	3.5	4.5	3,890	30	E., NW.	N.	17	6	11	8	14	8	2	9	15	11	11	8	0	11	0	0	2	5	0	S.
3.0	4.9	3.0	3.6	6,675	33	S.	NW.	10	3	5	6	9	12	9	35	4	12	17	2	0	5	1	10	0	0	0	O.
2.6	3.7	3.4	3.2	5,767	44	W.	NW.	12	7	7	12	7	17	8	20	0	16	12	2	0	3	6	17	0	0	0	N.
4.4	6.4	5.5	5.4	6,423	34	N., NW	NW.	13	3	3	15	8	7	6	37	1	7	17	7	0	14	17	30	0	0	0	D.
4.3	5.2	3.6	4.4	72,343	..	.....	NW.	143	67	83	139	184	89	67	259	64	129	173	63	0	102	66	147	22	31	0	Y.

YUMA, ARIZ.

[H=141. T=16. h=22.]

1.1	2.0	.6	1.2	4,654	30	N.	N.	36	15	10	2	10	4	7	9	0	26	5	0	0	0	0	2	0	0	0	J.
2.0	2.8	1.3	2.0	5,748	41	SE.	N.	20	10	5	8	16	4	15	6	0	20	6	2	0	0	0	0	0	0	0	F.
1.0	2.0	.7	1.2	4,578	28	N.	N.	23	9	14	3	9	9	19	6	1	27	4	0	0	0	0	0	5	0	0	M.
1.1	2.2	1.3	1.7	5,575	31	W.	S.	15	2	6	6	20	17	16	8	0	20	10	0	0	1	0	0	12	1	0	A.
.9	1.1	1.4	1.1	5,121	28	W.	SW.	6	11	8	11	17	19	14	7	0	27	4	0	0	0	0	0	18	1	0	M.
1.0	1.0	.5	.8	4,883	25	W., SE.	W.	3	9	7	10	15	14	28	3	1	27	3	0	0	1	0	0	29	2	0	J.
1.6	1.4	1.0	1.3	5,629	28	SE.	S.	4	5	5	14	35	21	8	2	0	26	5	0	0	0	0	0	31	1	0	J.
1.2	1.5	1.3	1.3	5,219	26	E., S.	S.	2	7	6	14	33	17	10	3	1	27	3	1	0	0	0	0	31	2	0	A.
1.4	2.7	1.1	1.7	3,421	38	S.	S.	2	16	13	9	20	13	14	1	2	24	4	2	0	2	0	0	27	2	0	S.
.8	1.3	.5	.7	4,291	32	NW.	N.	31	13	13	3	9	10	7	5	2	29	2	0	0	1	0	0	12	0	0	O.
1.6	2.5	1.3	1.8	3,286	21	N.	NE.	23	27	14	2	7	1	6	7	3	23	5	2	0	3	0	0	2	1	0	N.
.8	2.0	1.1	1.3	5,932	40	N., NW	N.	42	13	11	4	6	3	4	10	0	27	4	0	0	1	0	2	0	0	0	D.
1.2	1.9	1.0	1.4	58,337	..	.....	N.	207	137	112	86	197	131	148	67	10	303	55	7	0	9	0	4	167	10	0	Y.

APPENDIX No. 18.

Monthly normal temperature and departure of 1887 *therefrom* (*in degrees Fahrenheit*) *at stations of the Signal Service, U. S. Army.* This normal has been computed from the commencement of observations at each station to December,* 1887, *inclusive.*

[The monthly mean is obtained by dividing the sum of the tri-daily means by 3. Observations prior to August 25, 1872, were taken at 7.35 a. m., 4.35 and 11.35 p. m. (Washington time); from August 25, 1872, to November 1, 1879, at 7.35 a. m., 4.35 and 11 p. m. (Washington time); from November 1, 1879, to December 31, 1884, at 7 a. m., 3 and 11 p. m. (Washington time); from January 1, 1885, to December 31, 1886, at 7 a. m., 3 and 11 p. m. (75th meridian time); and from January 1, 1887, to December 31, 1887, at 7 a. m., 3 and 10 p. m. (75th meridian time)].

Stations.	January.		February.		March.		April.		May.		June.		July.		August.		September.		October.		November.		December.	
	Normal.	Departure, + or −	Normal.	Departure, + or −	Normal.	Departure, + or −	Normal.	Departure, + or −	Normal.	Departure, + or −	Normal.	Departure, + or −	Normal.	Departure, + or −	Normal.	Departure, + or −	Normal.	Departure, + or −	Normal.	Departure, + or −	Normal.	Departure, + or −	Normal.	Departure, + or −
Alabama:																								
Mobile	49.9	− 2.3	54.8	+ 7.7	59.5	− 0.6	66.7	− 0.4	74.1	− 0.2	80.2	− 2.5	81.7	− 1.3	80.5	− 0.6	76.8	+ 0.2	67.8	− 1.4	57.8	+ 0.8	51.7	− 0.9
Montgomery	48.0	− 2.8	52.6	+ 6.7	57.4	+ 0.2	64.8	+ 1.2	73.2	+ 2.5	79.3	+ 0.6	81.9	− 2.2	80.0	− 0.7	75.6	+ 0.1	65.6	− 2.1	54.8	+ 1.4	48.7	− 0.9
Alaska:																								
Sitka[1]	34.2	− 4.7	33.0	− 7.2	37.2	− 3.6	41.9	− 2.2	46.9	− 2.0	51.6	− 1.7	54.4	− 2.0	56.6	− 1.5	52.3	− 0.7	.....	.....	.....	.....	.....	.....
Arizona:																								
Apache, Fort	34.1	+ 2.7	39.2	+ 2.0	45.2	+ 4.3	50.4	+ 1.4	58.4	+ 3.2	67.5	+ 4.4	72.6	+ 0.3	70.2	+ 1.0	63.8	+ 3.0	53.8	+ 1.6	41.9	+ 4.2	36.6	− 3.2
Grant, Fort	42.7	+ 4.0	46.1	− 0.8	52.1	+ 5.7	57.3	− 0.5	66.7	0.0	75.7	+ 0.7	77.6	− 1.4	74.8	− 0.1	71.0	− 0.4	62.0	− 0.1	50.6	+ 3.0	45.3	− 5.9
Thomas, Fort[2]	40.6	+ 2.0	46.9	+ 0.5	53.8	+ 5.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Whipple Barracks	33.2	+ 4.2	37.7	− 0.2	43.4	+ 6.5	49.0	+ 0.7	57.3	+ 2.0	66.6	+ 2.9	72.8	− 0.3	70.2	+ 0.9	63.5	+ 2.0	52.6	+ 1.8	41.3	+ 3.4	36.8	− 5.1
Yuma	53.9	+ 1.7	59.0	− 2.9	64.9	+ 5.0	69.1	+ 0.7	77.4	− 0.2	85.2	+ 0.7	91.9	+ 0.1	90.7	+ 0.2	84.0	+ 0.7	72.2	+ 3.6	61.0	+ 2.9	55.9	− 2.8
Arkansas:																								
Fort Smith	32.2	+ 5.6	40.2	+ 4.9	50.2	+ 4.2	60.8	+ 3.0	69.0	+ 1.5	75.9	− 0.2	80.0	+ 1.5	77.4	+ 0.7	72.7	+ 0.9	62.0	− 1.7	50.4	− 0.3	39.5	− 1.1
Little Rock	40.0	+ 0.7	46.2	+ 1.3	53.2	+ 2.2	62.8	+ 1.2	70.3	+ 1.1	77.4	− 1.4	80.7	+ 0.5	78.5	+ 0.5	72.9	+ 2.0	64.0	+ 2.6	51.3	+ 0.5	43.7	− 2.7
California:																								
Bidwell, Fort	31.8	+ 1.7	32.3	− 7.8	39.4	+ 4.2	42.6	+ 0.9	53.7	+ 0.1	59.4	− 1.7	68.4	− 0.5	67.6	− 1.9	58.7	+ 0.5	49.4	+ 1.6	37.3	+ 2.3	35.0	− 3.7
Keeler	48.0	+ 0.1	45.4	− 5.4	52.8	+ 3.7	56.9	+ 0.5	67.7	− 1.0	73.1	+ 0.8	80.4	+ 0.7	80.7	− 1.0	73.5	− 1.2	62.0	+ 1.4	49.7	+ 2.5	44.3	− 1.4
Los Angeles	53.1	+ 2.3	54.4	− 2.8	56.2	+ 2.9	58.3	+ 0.8	62.1	+ 1.0	65.6	+ 0.5	68.7	+ 0.8	69.9	− 1.4	67.6	+ 0.6	62.7	+ 3.1	58.3	+ 1.7	55.0	− 1.3
Red Bluff	46.0	+ 2.7	49.0	− 5.6	55.3	+ 3.6	59.1	+ 1.1	67.0	+ 1.8	76.2	+ 0.9	82.4	+ 1.5	80.9	+ 0.4	74.3	+ 2.1	62.8	+ 8.3	53.7	+ 1.5	47.4	+ 0.8
Sacramento	46.3	+ 2.2	49.7	− 5.0	55.0	+ 2.8	57.8	+ 0.5	63.3	− 0.4	68.8	+ 0.3	72.1	− 1.9	71.7	− 2.6	69.2	+ 1.2	61.0	+ 5.5	52.4	+ 2.3	47.1	− 0.2
San Diego	53.9	+ 0.4	54.7	− 1.8	56.0	+ 1.2	58.0	+ 1.0	61.2	+ 0.9	64.3	+ 0.3	67.2	− 0.7	68.9	− 2.7	66.7	− 1.0	62.7	+ 1.8	58.3	+ 0.9	55.6	− 1.0
San Francisco	50.7	+ 1.1	51.8	− 4.8	53.6	+ 0.7	54.5	0.0	56.5	− 0.7	58.4	− 0.4	58.3	− 3.1	58.4	− 2.1	59.9	+ 0.5	59.8	+ 3.6	55.7	− 0.5	51.9	− 0.2
Colorado:																								
Denver	27.5	+ 3.8	32.4	− 0.4	39.7	+ 6.2	46.1	+ 2.6	56.7	+ 2.8	66.7	+ 2.6	72.0	− 3.0	70.1	− 1.2	61.2	+ 1.9	50.3	− 2.1	37.8	+ 2.6	30.8	− 2.0
Las Animas	21.2	+ 6.5	29.8	+ 2.7	41.3	+ 4.1	49.8	+ 2.0	59.6	+ 3.4	69.8	+ 2.7	75.5	− 0.1	73.0	+ 1.1	65.3	+ 1.6	52.4	− 0.5	37.4	+ 1.7	28.6	− 1.0
Montrose	25.4	+ 2.1	32.0	+ 1.6	38.6	+ 4.9	45.1	+ 1.2	57.4	+ 1.3	66.1	+ 3.8	71.2	− 0.8	67.7	− 0.5	60.1	+ 0.8	48.1	− 0.2	34.4	+ 2.8	26.8	− 6.0
Pike's Peak	2.4	− 2.0	3.7	+ 0.3	7.9	+ 6.7	12.9	+ 1.8	22.6	+ 3.9	32.8	+ 3.5	40.0	− 0.9	38.6	− 0.6	32.2	+ 1.2	21.6	+ 2.3	11.2	+ 7.1	6.2	− 4.0

Connecticut:																														
New Haven	27.2	— 2.0	28.9	+ 0.9	34.5	— 3.2	45.7	— 1.3	58.0	+ 2.5	67.1	— 1.6	72.5	+ 2.0	69.9	— 2.1	63.7	— 4.0	53.2	— 2.1	40.9	+ 1.8	31.1	+ 1.5
New London	28.5	+ 0.1	29.4	+ 2.1	35.0	— 1.0	45.4	— 0.4	56.4	+ 1.9	65.5	— 1.2	71.3	+ 1.9	69.7	— 0.5	63.2	— 2.0	53.6	— 0.5	41.5	+ 0.8	32.2	+ 2.8
Dakota:																								
Bismarck	3.6	—10.2	10.0	—13.6	22.4	+ 2.5	40.8	+ 2.0	55.5	+ 3.5	64.1	+ 4.4	69.7	+ 0.5	67.3	— 2.7	55.9	+ 1.6	43.4	— 2.7	25.7	+ 2.7	13.1	— 3.7
Buford, Fort	3.7	— 7.4	8.1	—13.1	23.9	+ 3.1	41.6	+ 1.7	54.7	+ 3.6	64.2	+ 2.0	68.0	— 0.1	66.1	— 1.7	54.5	+ 3.7	42.3	— 2.1	26.1	+ 0.6	9.9	— 0.5
Deadwood	20.9	— 0.7	23.6	— 8.2	32.1	+ 4.4	40.0	+ 1.2	50.2	+ 3.8	60.4	+ 3.1	65.2	+ 0.6	64.6	— 3.2	53.9	+ 2.8	43.7	— 2.9	33.0	+ 2.0	23.1	— 0.5
Huron	5.5	— 5.9	12.1	— 8.5	28.4	+ 2.1	45.0	+ 2.1	55.8	+ 6.3	66.6	+ 3.3	70.2	+ 1.8	67.7	— 2.2	57.0	+ 2.6	46.2	— 4.0	29.9	+ 0.5	16.2	— 6.2
Sully, Fort	9.0	— 5.9	16.2	—14.0	26.4	+ 7.6	45.2	+10.3	60.3	+ 4.0	68.8	+ 1.8	75.3	— 0.5	73.0	— 5.3	61.7	+ 1.1	48.1	— 2.6	28.8	+ 4.2	18.0	— 4.1
Totten, Fort	—8.8	— 2.5	—0.6	— 5.8	18.1	+ 0.9	39.7	— 1.9	54.0	+ 3.0	62.5	+ 3.1	66.2	+ 0.1	63.2	— 1.5	53.6	+ 1.5	41.4	— 4.3	23.6	+ 0.6	4.6	— 1.5
Yankton	13.6	— 5.8	19.3	— 8.0	30.2	+ 4.2	45.7	+ 5.2	59.8	+ 3.7	68.6	+ 2.2	73.6	+ 0.8	71.6	— 2.7	61.4	+ 0.6	49.2	— 2.4	32.4	+ 2.9	20.2	— 3.0
District of Columbia:																								
Washington City	32.7	+ 0.2	35.8	+ 3.1	41.3	— 2.8	52.7	— 1.1	64.3	+ 3.6	73.2	— 1.1	77.8	+ 2.7	74.5	— 1.3	67.7	— 2.7	57.0	— 1.6	44.3	— 0.6	35.5	+ 1.7
Florida:																								
Cedar Keys	55.8	— 5.5	60.8	+ 5.0	62.7	— 1.5	69.4	— 2.1	75.5	— 0.6	80.5	— 1.8	82.3	+ 0.3	81.7	+ 0.8	79.4	— 1.8	72.8	— 0.7	62.7	— 0.3	58.1	— 0.6
Jacksonville	54.9	— 5.1	58.3	+ 6.1	62.2	— 2.7	68.6	— 1.6	75.2	— 1.6	80.4	— 2.5	82.5	— 0.7	80.9	— 0.1	77.8	— 1.7	70.0	+ 0.1	61.4	— 0.5	55.6	0.0
Key West	69.7	— 3.2	71.4	+ 2.0	73.2	— 2.5	76.6	— 2.3	79.8	— 2.3	83.0	— 3.7	84.1	— 1.4	84.3	— 0.9	82.8	— 1.4	78.8	+ 0.1	74.3	— 1.3	70.0	+ 2.0
Pensacola	52.0	— 2.9	57.1	+ 6.2	60.2	0.0	67.4	— 0.2	74.0	+ 1.5	79.9	— 0.6	81.1	+ 0.7	80.6	+ 1.0	77.7	— 0.1	70.2	— 2.0	59.2	+ 1.0	54.2	— 0.7
Sanford[3]	56.7	— 0.8	62.3	+ 5.6	63.7	— 1.4	69.6	— 0.1	74.6	— 0.7	78.5	— 0.9	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Georgia:																								
Atlanta	42.2	— 2.6	47.5	+ 5.2	52.2	— 1.5	61.0	— 1.7	69.1	+ 2.9	75.2	+ 0.7	78.2	— 0.6	75.7	+ 0.5	71.5	+ 0.6	62.7	— 3.1	51.3	+ 1.2	44.3	— 2.0
Augusta	46.5	— 4.7	50.5	+ 4.3	55.6	— 2.5	63.7	— 0.3	72.5	+ 1.2	78.5	+ 0.4	81.7	+ 0.1	79.4	— 0.8	74.8	— 1.0	64.2	— 1.8	53.6	— 0.2	47.3	+ 0.2
Savannah	51.0	— 4.7	54.4	+ 4.3	59.0	— 2.5	66.2	— 2.5	73.6	— 1.1	79.8	— 2.7	82.6	— 2.2	80.5	— 0.6	75.8	— 2.5	66.8	— 1.3	57.8	— 1.4	51.9	— 1.1
Idaho:																								
Boisé City	29.2	+ 7.0	34.1	— 4.0	43.7	+ 3.9	49.9	— 0.6	57.6	+ 2.7	65.8	— 3.0	73.0	+ 0.8	72.1	— 1.6	60.2	+ 3.0	48.5	+ 2.0	38.4	+0.9	32.7	— 0.1
Illinois:																								
Cairo	34.4	— 1.0	40.0	+ 3.1	47.1	+ 0.8	58.5	+ 1.6	68.0	+ 2.1	75.1	0.0	79.5	+ 1.0	77.7	+ 0.3	69.7	+ 1.4	59.4	— 3.3	46.2	+ 0.4	37.7	— 1.4
Chicago	24.1	— 6.8	28.1	— 1.0	34.7	— 2.8	46.0	+ 1.4	56.8	+ 2.6	65.7	+ 1.6	72.4	+ 3.6	71.4	— 1.7	64.0	— 1.5	52.6	— 5.3	38.5	— 0.5	28.6	— 0.5
Springfield	25.7	— 2.3	32.2	+ 3.1	39.8	+ 0.9	53.5	+ 1.7	64.1	+ 3.1	71.5	+ 1.1	77.0	+ 2.7	74.0	+ 0.3	66.3	— 0.4	56.3	— 5.9	42.3	— 1.1	31.2	— 2.9
Indiana:																								
Indianapolis	28.2	— 3.8	32.7	+ 1.9	39.7	— 1.5	52.6	— 0.3	64.1	+ 3.2	72.3	+ 1.5	76.5	+ 4.1	73.8	— 0.5	65.8	0.0	54.9	— 4.7	40.7	— 0.2	32.0	— 1.2
Indian Territory:																								
Sill, Fort	35.0	+ 2.4	41.8	+ 0.7	52.0	+ 2.2	61.8	+ 1.0	70.0	+ 1.2	77.4	— 0.1	81.8	+ 2.2	79.8	+ 0.6	73.1	— 0.1	61.8	— 3.6	48.1	+ 0.8	37.9	— 1.2
Iowa:																								
Davenport	20.4	— 7.2	26.5	— 2.7	35.0	— 0.7	49.5	+ 2.8	61.7	+ 5.4	70.5	+ 2.5	75.3	+ 2.7	72.9	— 0.7	64.3	+ 0.1	52.4	— 4.9	37.2	+ 0.1	26.5	— 2.4
Des Moines	17.2	— 5.7	23.7	— 4.3	35.0	+ 0.7	49.9	+ 2.6	61.8	+ 3.9	70.0	+ 1.9	74.8	+ 2.7	72.9	— 0.5	63.9	— 0.1	52.8	— 4.4	37.3	0.0	23.6	— 0.7
Dubuque	17.6	— 7.0	23.6	— 2.9	32.9	— 0.5	48.2	+ 2.5	61.1	+ 5.4	68.7	+ 3.7	74.5	+ 3.7	71.7	— 0.7	62.7	— 0.9	51.1	— 4.8	35.2	— 0.2	24.6	— 1.7
Keokuk	23.2	— 4.1	29.4	+ 0.1	37.7	+ 1.2	51.5	+ 2.1	63.5	+ 3.0	72.2	+ 0.6	77.6	+ 1.5	75.0	— 0.9	66.3	— 0.4	54.4	— 4.4	38.8	+ 1.7	28.1	— 0.8
Kansas:																								
Concordia	16.1	+ 5.6	27.5	— 3.2	38.7	+ 3.7	53.4	+ 2.5	63.6	+ 2.6	71.0	+ 1.7	76.3	+ 1.4	73.3	— 0.3	66.9	— 0.5	54.5	+ 1.6	40.3	+ 1.4	28.1	— 1.5
Dodge City	25.3	+ 1.8	32.6	— 2.1	42.0	+ 2.6	52.9	+ 1.5	63.2	+ 2.2	72.7	+ 1.3	77.4	+ 1.3	75.1	— 0.3	67.3	+ 0.9	55.1	— 1.4	39.4	+ 3.1	30.8	— 1.9
Leavenworth	24.6	— 3.9	31.4	— 2.5	40.8	+ 1.9	53.6	+ 3.7	65.0	+ 2.9	73.6	— 0.3	78.0	+ 1.2	76.1	— 2.8	67.3	— 0.6	55.6	— 3.0	40.4	+ 2.4	29.8	— 2.6
Kentucky:																								
Louisville	34.1	— 2.0	38.5	+ 4.5	44.3	+ 1.0	55.8	+ 0.6	67.2	+ 3.7	74.6	+ 0.8	79.0	+ 3.3	76.3	+ 2.0	69.1	+ 1.7	58.2	— 2.7	45.3	+ 0.8	37.5	— 1.0
Louisiana:																								
New Orleans	53.4	— 2.0	58.3	+ 6.9	62.5	— 0.4	68.6	— 0.7	74.9	+ 0.3	80.7	— 2.4	82.5	— 2.0	81.8	— 0.8	77.9	— 0.6	70.2	— 2.1	60.8	+ 0.3	54.9	— 2.0
Shreveport	45.1	+ 0.1	51.3	+ 5.0	58.5	+ 2.5	65.9	+ 1.7	73.6	+ 1.8	80.5	— 0.3	83.0	— 0.6	82.0	— 0.4	75.1	+ 2.1	65.8	— 1.6	54.5	+ 1.4	48.8	— 3.4
Maine:																								
Eastport	19.9	+ 0.6	22.1	— 1.5	28.1	+ 0.4	38.1	— 0.6	47.4	+ 0.7	55.2	— 0.9	60.5	+ 0.4	60.6	— 0.7	55.5	— 0.9	47.0	— 0.6	36.0	+ 1.6	25.2	+ 0.3
Portland	22.9	— 4.2	25.4	— 3.2	31.9	— 3.1	43.4	— 3.2	54.7	+ 1.0	63.9	— 2.4	69.3	+ 0.8	67.3	— 2.5	60.3	— 3.2	49.9	— 2.3	38.1	— 0.4	28.9	— 1.0

(1) Closed October 1, 1887. (2) Third order after April 1, 1887. [3] Closed June 30.

Monthly normal temperature and departure of 1887 *therefrom (in degrees Fahrenheit) at stations of the Signal Service, etc.*—Continued.

Stations.	January.		February.		March.		April.		May.		June.		July.		August.		September.		October.		November.		December.	
	Normal.	Departure, + or −	Normal.	Departure, + or −	Normal.	Departure, + or −	Normal.	Departure, + or −	Normal.	Departure, + or −	Normal.	Departure, + or −	Normal.	Departure, + or −	Normal.	Departure, + or −	Normal.	Departure, + or −	Normal.	Departure, + or −	Normal.	Departure, + or −	Normal.	Departure, + or −
Maryland:																								
Baltimore	34.0	− 1.6	36.7	+ 1.5	41.6	− 3.8	53.0	− 1.8	64.5	+ 2.9	73.5	− 1.2	78.3	+ 2.0	75.0	− 1.7	67.9	− 3.2	57.7	− 1.8	45.3	− 0.2	36.7	+ 0.5
Massachusetts:																								
Boston	26.2	− 0.3	27.8	+ 1.1	33.7	− 2.1	44.2	− 0.3	56.2	+ 3.1	65.9	− 1.4	71.4	+ 2.0	69.1	− 2.0	62.1	− 2.5	51.9	− 0.9	39.9	+ 1.7	30.2	+ 1.9
Wood's Holl	.....	.....	.....	.....	.....	.....	....	.....	53.7	+ 1.3	62.5	− 1.3	69.0	+ 0.6	68.4	− 1.2	62.8	− 2.5	54.7	− 2.2	43.2	+ 0.3	35.2	− 0.5
Michigan:																								
Alpena	17.3	− 3.6	17.8	− 1.4	23.3	− 3.3	36.2	− 0.5	49.1	+ 5.0	59.5	+ 1.7	65.5	+ 2.7	63.8	− 2.2	56.6	− 2.8	45.2	− 2.9	32.4	+ 1.1	23.6	+ 3.5
Detroit	24.4	− 0.8	26.8	+ 1.5	32.7	− 1.7	45.2	+ 1.3	58.2	+ 5.2	67.4	+ 1.1	71.9	+ 4.0	69.9	− 1.6	62.7	− 2.7	51.8	− 4.3	38.0	+ 0.4	28.7	+ 0.8
Escanaba	13.5	− 5.9	15.4	− 2.4	21.8	− 2.6	35.7	− 1.3	49.6	+ 4.8	60.6	+ 1.5	66.6	+ 2.1	64.4	− 2.3	56.2	− 1.6	44.9	− 4.0	31.2	− 0.2	20.7	+ 4.1
Grand Haven	24.3	− 4.2	25.2	− 1.1	30.5	− 3.2	43.7	− 0.2	55.3	+ 4.2	64.3	+ 1.8	69.2	+ 3.2	67.6	− 2.1	60.8	− 2.3	50.2	− 4.6	37.2	− 1.0	28.8	+ 0.9
Mackinaw City	14.1	− 0.8	13.8	+ 2.3	19.8	+ 0.3	36.0	− 2.1	47.2	+ 2.1	58.7	0.0	64.5	+ 3.4	62.0	+ 0.9	56.8	− 2.5	47.0	− 4.7	35.4	− 2.2	25.5	+ 1.1
Marquette	15.8	− 7.8	17.8	− 5.8	23.1	− 4.4	37.0	− 1.5	49.6	+ 7.2	58.7	+ 0.8	65.1	+ 0.8	64.2	− 3.5	56.4	− 2.1	45.6	− 5.2	31.3	− 0.1	22.0	+ 2.7
Port Huron	20.8	− 1.8	22.9	+ 1.2	28.4	− 2.8	41.0	+ 0.7	53.2	+ 3.9	63.0	+ 1.4	68.7	+ 4.7	67.3	− 0.7	60.9	− 1.7	49.5	− 3.4	36.2	+ 0.7	26.6	+ 2.1
Minnesota:																								
Duluth	9.8	− 7.8	15.5	− 5.8	23.8	− 2.7	37.9	− 1.2	48.9	+ 0.1	58.1	− 2.7	66.4	+ 0.2	65.2	− 2.8	55.7	− 0.3	44.7	− 3.7	29.1	+ 1.1	16.2	+ 1.7
Moorhead	−4.0	− 5.3	4.5	− 6.3	19.3	+ 2.7	39.8	+ 1.4	54.6	+ 5.4	64.7	+ 3.4	67.5	+ 1.4	64.9	− 2.2	55.4	+ 0.7	42.5	− 4.1	24.3	+ 1.6	8.5	− 2.5
Saint Paul	11.7	−10.7	17.5	− 7.8	28.2	− 1.3	44.9	+ 0.1	58.8	+ 5.3	67.2	+ 2.4	71.9	+ 2.2	69.2	− 3.2	58.7	− 0.9	47.0	− 4.7	31.0	+ 0.2	18.1	− 1.0
Saint Vincent	−8.7	− 4.0	0.4	− 4.5	14.2	+ 1.9	36.0	+ 2.0	52.6	+ 5.1	62.2	+ 3.1	64.7	+ 1.5	62.4	− 1.7	52.5	+ 2.3	39.8	− 4.8	20.4	− 0.5	4.5	− 2.0
Mississippi:																								
Vicksburg	46.9	− 0.5	52.8	+ 6.4	58.7	+ 1.7	65.6	+ 1.0	73.3	+ 1.6	79.6	− 0.9	81.7	− 1.8	80.3	− 0.4	75.1	+ 0.8	65.8	− 3.2	55.2	+ 1.9	49.8	− 3.5
Missouri:																								
Lamar	24.0	+ 4.6	35.6	+ 2.3	43.6	+ 3.9	56.1	+ 1.9	66.3	+ 0.9	72.0	+ 1.2	77.3	+ 0.6	74.9	0.0	68.0	− 0.1	55.4	− 1.8	45.0	0.0	31.6	− 0.9
Saint Louis	31.0	− 0.2	35.8	+ 4.7	43.2	+ 2.6	55.7	+ 5.0	66.5	+ 4.9	74.6	+ 2.7	79.2	+ 4.5	77.0	+ 2.2	68.6	+ 1.4	57.8	− 3.4	43.4	+ 1.4	34.0	− 2.5
Montana:																								
Assinaboine, Fort	9.1	+ 0.2	14.1	−16.7	30.9	+ 2.7	43.2	+ 2.2	53.6	+ 2.6	63.2	− 2.9	67.5	+ 0.7	65.4	− 2.7	54.1	+ 2.1	42.3	+ 1.0	30.2	− 1.3	18.7	− 5.4
Custer, Fort	14.7	+ 1.8	19.6	−17.2	33.7	+ 4.2	44.9	+ 1.4	55.6	+ 2.0	64.4	+ 1.1	71.0	+ 0.4	69.5	− 1.6	57.7	+ 2.6	45.9	− 2.4	32.6	+ 1.5	20.8	+ 0.7
Helena, Fort	15.9	+ 4.7	20.9	−15.9	34.8	+ 5.5	42.2	+ 0.2	51.9	− 0.4	60.1	− 2.5	66.8	− 0.2	66.4	− 2.6	55.5	+ 0.5	43.1	− 0.2	31.3	+ 2.6	24.1	− 1.1
Maginnis, Fort	16.1	+ 2.4	17.9	− 9.0	31.9	+ 4.8	39.8	+ 1.3	50.2	+ 2.3	58.4	− 1.1	63.8	+ 1.0	62.9	− 2.5	52.2	+ 1.3	41.6	− 1.0	33.7	− 1.1	23.1	− 2.3
Poplar River	−4.2	− 2.2	1.0	− 9.5	27.0	− 0.8	42.6	+ 0.5	55.7	+ 1.5	66.1	− 1.0	68.8	− 1.2	64.9	− 0.6	54.8	+ 3.0	41.8	− 2.8	25.5	− 0.6	5.1	+ 0.5
Nebraska:																								
North Platte	19.4	− 0.5	25.9	− 6.6	35.5	+ 3.0	47.6	+ 2.3	58.9	+ 3.0	68.2	+ 2.2	73.7	+ 0.3	71.6	− 1.8	61.8	+ 1.1	49.7	− 2.6	34.7	+ 1.5	25.4	− 2.9
Omaha	19.1	− 7.3	25.7	− 7.5	35.6	+ 2.4	50.2	+ 4.3	62.6	+ 3.5	71.6	+ 0.8	76.2	+ 0.1	74.1	− 2.1	63.9	+ 1.4	52.9	− 2.2	36.2	+ 3.4	24.4	− 0.8
Valentine	11.0	+ 4.0	19.9	− 7.1	31.2	+ 4.6	45.4	+ 1.7	61.0	+ 0.1	67.3	+ 2.2	74.0	− 1.7	69.6	− 2.3	60.3	+ 1.3	37.7	+ 6.9	33.7	+ 0.2	22.7	− 2.7
Nevada:																								
Winnemucca	30.3	+ 4.5	34.0	− 5.0	41.5	+ 4.1	46.8	− 1.2	54.1	+ 2.5	63.3	− 0.9	71.8	+ 0.4	70.7	− 2.1	60.2	0.0	47.3	+ 3.0	35.7	+ 1.7	32.2	− 4.2
New Hampshire:																								
Mt. Washington[1]	5.4	+ 0.2	6.3	+ 0.7	10.0	+ 0.3	21.1	− 2.1	34.2	+ 8.0	43.9	+ 2.7	47.9	+ 5.2	46.9	− 2.6	40.2	− 4.1	.....	.....	.....	.....	.....	.....

New Jersey:																								
Atlantic City	31.7	− 0.3	33.4	+ 3.2	37.8	− 2.2	46.5	− 0.2	57.2	+ 1.9	66.7	− 0.6	72.6	+ 2.7	72.0	− 0.7	66.9	− 3.5	57.0	− 1.5	44.6	− 0.6	35.7	+ 1.0
New Mexico:																								
Santa Fé	27.7	+ 2.2	32.3	+ 1.6	39.5	+ 3.5	45.5	+ 1.3	55.9	− 0.6	65.0	+ 0.6	68.1	− 1.1	65.9	− 0.1	59.1	+ 2.0	49.6	+ 1.0	37.1	+ 4.8	30.4	− 3.6
Stanton, Fort	34.7	+ 1.3	38.7	+ 0.7	41.6	+ 2.4	48.7	0.0	55.8	.....	64.0	+ 0.5	66.8	− 1.2	64.4	− 0.9	58.8	+ 1.3	49.0	− 0.5	41.2	+ 0.5	35.3	− 5.3
New York:																								
Albany	22.7	− 1.8	24.8	+ 0.4	31.8	− 3.7	45.4	− 2.2	59.5	+ 5.9	68.3	+ 0.7	72.7	+ 3.9	70.4	− 1.9	62.9	− 3.6	51.1	− 1.7	39.0	− 0.9	28.2	− 0.7
Buffalo	24.0	− 1.8	24.6	+ 1.2	29.9	− 2.5	41.4	− 1.8	54.1	+ 7.5	64.5	+ 2.0	69.9	+ 5.0	68.8	− 0.7	61.9	− 3.0	50.6	− 3.4	37.0	+ 0.4	29.0	+ 1.8
New York City	29.8	+ 0.3	31.1	+ 2.6	36.3	− 2.0	47.3	+ 0.4	59.1	+ 3.8	68.4	− 0.2	73.7	+ 3.0	72.0	− 0.6	65.5	− 2.4	55.5	− 0.8	43.0	+ 0.7	33.3	+ 2.8
Oswego	24.8	− 4.5	25.3	− 1.6	30.8	− 4.4	42.5	− 2.0	54.0	+ 4.7	63.9	− 1.6	69.8	+ 2.6	68.9	− 2.6	61.8	− 3.6	50.9	− 4.1	38.5	− 1.0	29.3	− 0.9
Rochester	23.5	− 1.8	24.4	+ 0.5	29.9	− 3.1	42.9	− 1.0	56.6	+ 6.0	65.7	− 0.2	70.5	+ 3.7	68.6	− 2.2	61.6	− 2.9	50.1	− 3.7	36.7	+ 0.9	27.8	+ 1.3
North Carolina:																								
Charlotte	40.3	− 2.1	45.5	+ 3.0	49.8	− 2.1	59.0	+ 0.4	68.9	+ 1.7	75.3	− 0.1	78.9	+ 0.7	76.0	− 1.3	71.1	− 1.0	61.9	− 3.9	49.8	+ 0.3	42.5	− 0.4
Hatteras	43.6	+ 1.1	47.1	+ 4.2	48.9	+ 0.5	56.5	+ 0.5	66.5	+ 2.6	73.7	− 1.3	78.3	+ 0.6	77.1	− 0.6	74.1	− 3.2	66.4	− 1.3	55.6	− 1.4	47.2	+ 0.7
Wilmington	46.5	− 2.3	49.6	+ 5.1	54.1	− 2.0	61.5	− 1.6	69.8	+ 1.3	76.5	− 0.9	80.4	+ 0.5	78.4	− 0.9	73.3	− 2.1	64.1	− 1.4	54.2	− 2.3	47.7	+ 0.4
Ohio:																								
Cincinnati	32.7	− 3.1	36.8	+ 2.5	42.8	− 1.9	54.4	− 1.1	65.6	+ 3.7	73.7	+ 0.9	78.1	+ 3.5	75.5	+ 0.2	68.1	+ 0.1	57.2	− 4.2	44.1	− 0.7	36.0	− 1.3
Cleveland	25.7	− 0.8	27.8	+ 3.8	33.4	− 2.1	45.2	− 0.1	58.2	+ 3.3	67.4	+ 1.1	71.9	+ 4.4	69.9	− 0.9	63.5	− 1.9	52.9	− 2.8	39.2	+ 1.0	29.8	+ 1.8
Columbus	27.4	− 0.6	32.4	+ 3.7	38.0	− 1.0	50.6	+ 0.6	63.3	+ 4.1	70.4	+ 1.3	75.7	+ 4.1	72.2	+ 0.3	65.9	+ 0.1	55.2	− 3.9	41.1	+ 0.3	31.8	+ 1.2
Sandusky	26.2	− 2.8	29.6	+ 0.9	35.0	− 3.4	46.9	− 1.7	59.9	+ 1.2	67.8	+ 1.4	73.5	+ 4.1	71.3	− 0.7	65.1	− 2.3	54.4	− 4.7	40.7	− 0.9	31.5	− 1.0
Toledo	26.2	− 4.3	28.9	+ 0.3	35.1	− 3.3	47.4	− 1.6	59.3	+ 4.4	69.6	− 0.1	74.0	+ 3.2	71.2	− 1.7	63.9	− 2.7	53.0	− 4.9	39.3	− 0.7	30.1	− 1.1
Oregon:																								
Portland	39.3	+ 3.5	41.4	− 9.5	47.4	+ 2.0	51.5	− 113	56.6	+ 1.3	61.8	− 1.3	66.4	− 0.3	65.3	− 0.8	60.7	− 1.1	53.0	+ 0.8	45.0	− 0.6	41.3	+ 1.3
Roseburgh	40.9	+ 2.5	41.9	− 8.3	47.6	+ 2.0	50.8	− 0.5	56.1	+ 1.1	61.1	− 0.9	66.0	+ 0.1	65.2	− 0.5	60.8	+ 0.7	51.4	+ 2.3	44.4	+ 1.1	42.2	+ 0.9
Pennsylvania:																								
Erie	26.7	− 2.7	27.8	+ 0.1	32.6	− 3.5	43.8	− 1.6	57.6	+ 3.5	67.1	+ 0.3	72.0	+ 3.8	69.9	− 1.3	63.7	− 3.7	53.0	− 4.1	40.4	− 0.6	32.0	+ 0.2
Philadelphia	31.3	+ 0.2	33.5	+ 2.6	39.0	− 2.6	50.0	− 0.2	62.2	+ 4.5	71.1	− 0.2	76.2	+ 3.5	73.6	− 0.6	66.7	− 2.7	56.3	− 0.7	43.7	+ 1.6	34.5	+ 2.4
Pittsburgh	30.1	+ 0.3	32.9	+ 5.6	38.1	− 1.3	50.2	+ 1.1	62.4	+ 5.8	70.8	+ 1.4	74.6	+ 6.0	71.9	+ 0.4	65.0	+ 0.1	54.2	− 1.2	41.1	+ 3.6	33.2	+ 3.1
Rhode Island:																								
Block Island	30.5	+ 0.9	31.1	+ 1.2	34.5	− 0.8	43.5	− 0.3	52.5	+ 3.3	62.2	− 0.5	69.2	− 2.2	68.3	− 0.2	63.9	− 2.4	55.0	− 0.9	45.4	− 0.1	36.0	+ 1.3
South Carolina:																								
Charleston	48.8	− 3.2	52.6	+ 4.1	57.1	− 2.3	64.1	− 1.5	72.7	0.0	79.2	− 1.7	82.5	− 0.8	80.5	− 0.3	76.0	− 2.0	67.0	− 1.0	57.3	− 1.1	50.9	+ 0.1
Tennessee:																								
Chattanooga	40.6	− 1.2	45.4	+ 5.8	50.8	0.0	60.0	+ 1.5	68.3	+ 2.4	74.6	− 0.4	77.7	+ 0.4	75.6	+ 0.7	70.5	+ 0.5	61.8	− 4.0	49.3	+ 0.8	42.2	− 2.1
Knoxville	37.1	+ 0.4	42.0	+ 7.6	47.5	+ 0.4	57.5	+ 1.5	66.6	+ 3.6	73.3	+ 0.7	76.5	+ 2.0	74.7	+ 0.3	68.8	+ 1.1	58.0	− 1.4	46.1	+ 1.4	38.8	+ 0.2
Memphis	39.7	+ 0.6	44.7	+ 4.3	51.7	+ 2.0	61.4	+ 2.2	70.8	+ 2.4	77.9	− 0.9	81.1	− 0.4	79.1	− 0.2	71.7	+ 2.2	61.7	− 1.5	49.7	+ 1.8	42.0	− 1.4
Nashville	37.9	0.0	42.8	+ 6.5	49.1	+ 0.1	59.5	+ 0.3	69.4	+ 1.3	76.5	− 1.8	79.9	+ 0.8	78.0	+ 0.5	70.7	+ 1.6	60.2	− 2.9	47.8	+ 0.6	40.5	− 2.0
Texas:																								
Abilene	39.3	+ 4.4	48.4	+ 0.5	56.2	+ 2.9	63.4	+ 1.9	75.0	− 2.3	78.8	− 0.2	84.0	− 0.1	81.6	− 0.4	75.1	+ 0.8	63.0	− 1.3	53.6	− 1.0	44.6	− 4.3
Brownsville	57.3	+ 1.2	62.2	+ 4.5	68.2	− 1.3	73.9	− 1.8	78.3	− 2.2	82.2	− 3.4	83.5	− 2.3	82.6	− 0.8	79.3	− 1.4	74.6	− 4.6	65.7	+ 0.6	60.3	− 3.8
Davis, Fort	43.5	+ 2.7	48.6	+ 3.3	54.3	+ 1.4	60.7	+ 0.6	68.6	+ 0.4	74.6	− 0.9	75.6	− 0.2	72.4	+ 2.2	67.4	+ 0.9	60.8	− 3.1	50.7	+ 1.6	45.1	− 5.1
Elliott, Fort	30.6	+ 3.5	36.9	+ 2.9	46.9	+ 4.3	55.6	+ 1.2	63.8	+ 2.2	73.0	+ 0.6	77.0	+ 2.6	74.7	+ 1.3	68.2	+ 1.3	56.8	− 1.8	42.5	+ 2.6	34.4	− 1.7
El Paso	44.6	+ 1.4	50.2	0.0	56.6	+ 2.5	63.0	0.0	72.4	− 0.6	80.3	− 0.4	82.0	− 1.1	79.2	+ 0.7	72.6	+ 1.7	63.4	0.0	51.0	+ 3.2	45.8	− 5.6
Galveston	52.1	− 0.9	57.2	+ 5.7	63.4	+ 1.8	69.3	+ 0.1	76.2	− 0.3	82.3	− 2.4	84.3	− 1.4	83.6	− 0.5	79.7	0.0	72.3	− 2.9	62.3	+ 1.7	56.3	− 3.0
Palestine	42.2	+ 3.7	52.1	+ 2.6	58.9	+ 2.6	65.4	+ 0.6	71.2	+ 0.9	78.2	− 1.1	81.4	+ 0.6	80.2	+ 0.7	75.6	− 0.4	66.1	− 2.2	56.6	− 0.1	48.8	− 3.2
Rio Grande City	56.4	+ 2.3	63.1	+ 5.4	69.8	+ 0.4	76.5	− 0.8	80.4	− 0.3	84.7	− 3.3	86.1	− 1.6	83.8	+ 1.6	80.7	− 0.5	73.5	− 3.4	65.0	+ 0.1	59.2	− 5.0
San Antonio	50.6	− 0.4	56.0	+ 2.7	63.3	+ 1.7	69.5	− 0.5	75.3	− 0.9	81.2	− 1.9	82.9	+ 0.9	82.3	+ 0.7	77.5	0.0	69.5	− 2.6	58.7	+ 0.8	53.3	− 3.9
Utah:																								
Frisco	30.3	+ 1.6	33.5	− 5.1	38.2	+ 6.9	42.6	+ 1.0	57.8	− 1.6	66.8	0.0	73.1	− 0.9	70.2	− 0.3	63.4	+ 0.4	50.6	0.0	38.2	+ 4.7	33.5	− 6.9
Salt Lake City	29.0	+ 4.2	33.8	+ 0.2	42.0	+ 5.1	48.9	− 0.3	57.7	+ 2.7	67.6	+ 1.1	75.6	− 0.3	74.6	− 0.6	64.2	+ 1.5	52.1	+ 0.4	38.9	+ 4.8	32.9	− 3.2

(1) Closed October 1, 1887.

Monthly normal temperature and departure of 1887 *therefrom* (*in degrees Fahrenheit*) *at stations of the Signal Service, etc.*—Continued.

Stations.	January.		February.		March.		April.		May.		June.		July.		August.		September.		October.		November.		December.	
	Normal.	Departure, + or −.	Normal.	Departure, + or −.	Normal.	Departure, + or −.	Normal.	Departure, + or −.	Normal.	Departure, + or −.	Normal.	Departure, + or −.	Normal.	Departure, + or −.	Normal.	Departure, + or −.	Normal.	Departure, + or −.	Normal.	Departure, + or −.	Normal.	Departure, + or −.	Normal.	Departure, + or −.
Virginia:																								
Chincoteague[1]	34.1	+ 1.1	37.7	+ 4.2	40.4	− 0.1	49.8	− 0.8	60.4	+ 2.4	69.2	− 1.9	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Lynchburgh	36.3	− 0.9	40.2	+ 3.5	45.3	− 1.8	55.7	− 2.2	66.5	+ 2.4	74.1	− 1.3	78.5	+ 1.4	75.4	− 1.4	68.7	− 2.0	57.9	− 2.8	45.8	+ 0.5	38.4	− 0.5
Norfolk	40.4	− 1.0	42.9	+ 3.8	47.4	− 3.3	56.1	− 3.1	66.6	+ 1.3	75.1	− 2.0	79.4	+ 1.3	76.8	− 1.7	70.9	− 1.6	61.2	− 0.8	50.0	− 0.9	42.2	+ 0.3
Washington:																								
Canby, Fort	41.9	+ 1.3	41.2	− 6.8	45.8	− 0.4	48.4	− 2.1	52.5	− 0.5	55.3	− 1.2	58.2	− 3.2	58.7	− 1.9	57.5	− 2.1	52.9	+ 0.3	48.0	− 1.5	43.7	− 0.1
Olympia	38.3	+ 2.4	38.9	− 7.3	44.4	+ 0.9	48.0	− 0.8	53.8	+ 1.4	58.8	− 1.5	61.9	− 0.2	62.0	− 0.9	56.0	0.0	49.0	+ 0.3	43.8	− 0.4	40.7	+ 0.6
Port Angeles	35.8	+ 2.7	37.3	− 8.4	41.7	− 1.0	44.3	− 0.9	49.7	− 0.1	53.4	− 1.2	56.4	− 2.1	55.4	− 0.3	52.0	− 0.9	46.1	− 0.1	41.3	+ 0.2	40.1	− 0.8
Spokane Falls	24.5	+ 7.1	27.1	− 8.6	40.4	+ 2.2	47.8	− 0.8	56.4	+ 0.1	63.4	− 3.2	69.3	+ 0.7	68.0	+ 0.1	56.7	0.0	45.6	0.0	36.2	+ 0.5	30.4	+ 2.6
Tatoosh Island	41.3	+ 1.6	40.0	− 5.7	44.4	− 0.5	47.2	− 1.6	50.6	− 0.8	53.6	− 1.3	56.0	− 2.1	55.8	− 1.1	53.8	− 1.2	49.9	− 0.3	46.5	− 0.6	42.9	+ 0.9
Walla Walla	33.4	+ 7.6	33.1	−10.0	47.0	+ 2.6	51.8	− 0.3	61.2	− 0.3	66.0	− 2.1	76.1	− 0.6	73.0	− 0.8	62.6	− 1.4	51.0	+ 0.9	40.3	+ 0.5	40.3	− 0.4
Wisconsin:																								
La Crosse	15.1	− 4.4	21.3	− 5.3	31.1	− 1.5	47.1	+ 0.6	60.8	+ 4.5	68.9	+ 2.2	73.5	+ 1.3	70.7	− 3.0	61.3	− 2.3	49.5	− 5.2	33.7	− 0.6	22.2	− 0.9
Milwaukee	19.2	− 5.0	23.4	− 0.6	30.3	− 1.1	42.0	+ 0.4	53.5	+ 3.4	62.8	0.0	69.1	+ 3.3	68.2	− 1.7	60.9	− 0.5	49.4	− 3.8	35.1	+ 0.8	24.2	+ 1.8
Wyoming:																								
Bridger, Fort	21.2	+ 0.3	23.4	− 5.8	30.0	+ 5.5	37.4	+ 1.3	49.6	+ 0.5	56.5	+ 1.9	64.0	+ 0.3	60.8	+ 0.4	52.8	+ 2.6	42.1	+ 0.5	30.3	+ 4.2	24.9	− 5.5
Cheyenne	24.7	.....	28.0	.....	33.6	+ 8.5	39.7	+ 3.2	51.0	+ 2.6	61.3	+ 2.9	67.0	− 1.8	64.8	− 1.9	55.7	+ 2.9	44.4	− 1.3	34.0	+ 4.0	27.3	− 0.7

(1) Closed July 1, 1887.

APPENDIX NO. 19.

Monthly normal pressure (fifteen years) and temperature (eight years).

[Prepared by Assistant Professor H. A. Hazen.]

Station.	Latitude.	Longitude.	Height.	January.			February.			March.			April.			May.		
				Pressure.		Temperature.	Pressure.		Temperature.	Pressure.		Temperature.	Pressure.		Temperature.	Pressure.		Temperature.
				Observed.	Reduced.		Observed.	Reduced.		Observed.	Reduced.		Observed.	Reduced.		Observed.	Reduced.	
	° ′	° ′		In.	In.	°	In.	In.	°	In.	In.	°	In.	In.	°	In.	In.	°
Abilene	32 14	99 45	1,748	8.30	0.20	41	.26	.13	48	.21	.05	56	.14	.96	64	.13	.92	72
Albany	42 39	73 45	85	0.01	0.10	24	.99	.08	26	.90	.99	32	.87	.96	47	.89	.98	61
Alpena	45 5	83 30	609	9.35	0.06	16	.36	.07	17	.32	.02	22	.32	.00	36	.31	.97	50
Apache	33 48	109 57	5,050	5.03	0.16	34	.02	.11	39	.04	.08	45	.98	.98	50	.99	.92	58
Assinaboine	48 32	109 42	2,690	7.12	0.15	10	.16	.16	15	.13	.05	30	.12	.97	42	.12	.91	54
Atlanta	33 45	84 23	1,129	8.98	0.21	42	.96	.18	48	.89	.10	52	.85	.04	61	.87	.05	69
Atlantic City	39 22	74 25	34	0 10	0.13	32	.07	.10	34	.97	.00	37	.94	.97	47	.98	.01	57
Augusta	33 28	81 54	183	0.00	0.20	46	.97	.17	52	.89	.09	55	.84	.03	64	.84	.03	72
Baltimore	39 18	76 37	45	0.11	0.16	34	.09	.14	37	.98	.03	41	.95	.00	53	.97	.02	65
Benton	47 50	110 40	2,681	7.12	0.14	11	.16	.14	20	.17	.07	31	.19	.02	44	.15	.94	55
Bismarck	46 47	100 38	1,681	8.22	0.19	2	.22	.16	9	.21	.10	23	.15	.97	40	.12	.89	56
Block Island	41 10	71 36	26	0.06	0.09	32	.04	.07	32	.93	.96	35	.92	.95	44	.97	.00	53
Boisé City	43 37	116 8	2,750	7.25	0.24	29	.22	.19	33	.18	.09	42	.13	.01	49	.12	.95	58
Boston	42 21	71 4	125	9.93	0.07	26	.91	.05	29	.81	.95	33	.80	.93	45	.85	.98	56
Brownsville	25 53	97 26	57	0.09	0.15	57	.03	.09	62	.97	.03	68	.89	.95	74	.88	.94	78
Buffalo	42 53	78 53	690	9.30	0.09	23	.30	.08	24	.23	.00	28	.22	.98	41	.24	.98	54
Buford	48 0	103 56	1,900	7.96	0.17	2	.98	.17	8	.96	.08	24	.92	.97	41	.89	.89	55
Cairo	37 0	89 10	344	9.78	0.17	34	.74	.12	40	.67	.04	47	.60	.97	59	.60	.96	68
Cedar Keys	29 8	83 2	22	0.16	0.18	56	.13	.15	61	.08	.10	63	.03	.05	69	.00	.02	75
Charleston	32 47	79 56	52	0.13	0.18	50	.10	.15	54	.02	.07	57	.98	.03	64	.98	.03	73
Charlotte	35 13	80 51	808	9.29	0.18	40	.27	.15	46	.18	.05	49	.16	.01	59	.18	.02	69
Chattanooga	35 4	85 15	772	9.35	0.19	40	.32	.15	46	.25	.08	50	.20	.02	60	.21	.02	68
Cheyenne	41 8	104 48	6,105	8.89	0.19	25	.89	.17	26	.92	.08	34	.93	.01	40	.97	.92	50
Chicago	41 52	87 38	715	9.31	0.11	23	.30	.09	28	.25	.04	34	.21	.98	46	.21	.97	57
Cincinnati	39 6	84 30	628	9.46	0.17	32	.44	.14	37	.36	.06	42	.32	.00	54	.33	.99	66

APPENDIX No. 19.—*Monthly normal pressure, etc.*—Continued.

Station.	Latitude.	Longitude.	Height.	January.			February.			March.			April.			May.		
				Pressure.		Temperature.	Pressure.		Temperature.	Pressure.		Temperature.	Pressure.		Temperature.	Pressure.		Temperature.
				Observed.	Reduced.		Observed.	Reduced.		Observed.	Reduced.		Observed.	Reduced.		Observed.	Reduced.	
	° ′	° ′		In.	In.	°	In.	In.	°	In.	In.	°	In.	In.	°	In.	In.	°
Cleveland	41 30	81 42	690	9.[illegible]3	0.11	25	.33	.10	28	.26	.04	32	.24	.00	45	.26	.00	58
Columbus	39 58	83 0	812	9.24	0.15	28	.22	.12	33	.15	.04	38	.12	.99	51	.14	.99	63
Corpus Christi	27 49	97 25	20	0.15	0.17	51	.09	.11	58	.03	.05	64	.96	.98	70	.95	.97	76
Custer	45 42	107 34	3,040	6.79	0.16	14	.82	.16	19	.80	.06	33	.78	.97	45	.78	.91	55
Davenport	41 30	90 38	615	9.45	0.15	20	.42	.11	26	.37	.06	35	.31	.98	50	.31	.97	62
Davis	30 38	103 56	4,928	5.21	0.19	43	.20	.14	48	.17	.06	54	.15	.00	60	.17	.95	68
Deadwood	44 23	103 43	4,600	5.25	0.18	20	.26	.17	22	.30	.10	31	.30	.01	39	.33	.93	50
Denver	39 45	105 0	5,281	4.67	0.19	29	.66	.16	31	.66	.06	39	.66	.98	47	.70	.92	56
Des Moines	41 35	93 37	866	9.19	0.18	17	.16	.13	24	.11	.06	35	.04	.96	50	.04	.94	62
Detroit	42 20	83 3	662	9.35	0.10	25	.34	.08	28	.28	.02	34	.27	.99	46	.28	.99	59
Dodge City	37 45	100 0	2,524	7.49	0.20	24	.40	.14	31	.37	.05	42	.31	.94	53	.32	.91	62
Dubuque	42 30	90 44	665	9.37	0.13	16	.35	.10	23	.30	.04	32	.25	.97	48	.25	.96	60
Duluth	46 48	92 6	672	9.32	0.11	7	.32	.09	13	.29	.05	23	.26	.00	37	.23	.96	49
Eastport	44 54	66 59	53	9.94	0.00	20	.90	.96	22	.82	.88	27	.83	.89	38	.90	.96	47
Elliott	35 30	100 21	2,650	7.28	0.18	31	.25	.12	36	.23	.05	46	.17	.94	56	.18	.91	64
El Paso	31 47	106 30	3,796	6.28	0.17	44	.26	.12	49	.22	.03	56	.19	.97	63	.18	.89	72
Erie	42 7	80 5	681	9.33	0.10	26	.32	.08	28	.25	.01	31	.24	.98	44	.26	.98	58
Escanaba	45 48	87 5	608	9.35	0.06	12	.36	.06	14	.33	.02	21	.31	.98	36	.30	.96	50
Fort Smith	35 22	94 24	470	9.65	0.18	35	.60	.12	42	.53	.04	51	.45	.95	61	.45	.94	69
Galveston	29 18	94 47	44	0.12	0.16	52	.07	.11	58	.01	.05	63	.95	.99	70	.94	.98	76
Grand Haven	43 5	86 18	620	9.37	0.07	24	.37	.07	25	.33	.02	30	.30	.98	44	.30	.96	56
Grant	32 39	109 57	4,860	5.22	0.16	42	.22	.14	45	.20	.07	51	.17	.99	57	.18	.93	66
Hatteras	35 15	75 40	11	0.15	0.16	45	.12	.13	48	.03	.04	49	.99	.00	57	.02	.03	67
Helena	46 34	112 4	4,069	5.75	0.12	19	.80	.15	21	.80	.06	34	.80	.00	42	.80	.93	52
Huron	44 21	98 9	1,307	8.68	0.21	7	.66	.17	13	.64	.10	28	.56	.98	44	.54	.93	57
Indianapolis	39 46	86 10	766	9.29	0.16	27	.27	.12	33	.20	.04	39	.16	.99	52	.18	.00	61
Jacksonville	30 20	81 39	43	0.14	0.18	55	.11	.15	60	.05	.09	62	.00	.04	69	.98	.02	75
Keokuk	40 22	91 26	618	9.45	0.15	22	.42	.11	28	.36	.04	38	.29	.96	52	.29	.95	64
Key West	24 34	81 49	22	0.12	0.14	70	.10	.12	72	.08	.10	73	.02	.04	76	.99	.01	80

Knoxville	35 56	83 58	970	9.13	.20	38	.10	.16	44	.03	.09	47	.99	.02	58	.01	.03	67
La Crosse	43 49	91 15	744	9.25	0.13	14	.26	.10	20	.22	.04	30	.16	.96	48	.15	.94	61
Las Animas	38 4	103 12	3,809	6.03	0.21	22	.00	.14	29	.99	.05	40	.95	.94	50	.99	.91	60
Leavenworth	39 19	94 57	842	9.25	0.20	24	.20	.14	30	.15	.07	41	.07	.96	54	.06	.94	65
Little Rock	34 45	92 6	309	9.85	0.20	40	.80	.14	46	.74	.08	53	.66	.99	63	.65	.98	70
Los Angeles	34 3	118 15	339	9.72	0.09	53	.71	.08	54	.69	.05	56	.65	.01	57	.60	.96	62
Louisville	38 15	85 45	551	9.56	0.18	34	.53	.14	40	.46	.07	44	.41	.00	56	.41	.99	67
Lynchburgh	37 25	79 9	658	9.45	0.17	36	.42	.14	41	.33	.05	45	.30	.00	56	.33	.01	67
Maginnis	47 12	109 10	4,370	5.41	0.14	18	.46	.16	21	.49	.09	31	.51	.03	39	.53	.96	49
Marquette	46 34	87 24	672	9.28	0.05	14	.20	.06	15	.28	.04	22	.26	.00	37	.25	.98	50
Memphis	35 9	90 3	320	9.83	0.19	39	.79	.15	45	.72	.07	51	.65	.99	62	.65	.99	71
Milwaukee	43 2	87 54	697	9.30	0.10	18	.30	.09	23	.25	.03	30	.22	.99	42	.22	.98	55
Mobile	30 41	88 2	35	0.15	0.19	50	.12	.15	56	.06	.09	60	.00	.03	67	.98	.01	74
Montgomery	32 23	86 18	217	9.96	0.20	48	.92	.16	53	.85	.09	57	.80	.04	65	.79	.02	73
Moorhead	46 52	96 44	926	9.07	0.17	-1	.06	.15	5	.04	.10	19	.96	.98	39	.93	.93	55
Mount Washington	44 16	71 18	6,279	3.39	0.07	6	.39	.05	7	.39	.02	9	.54	.98	21	.74	.98	35
Nashville	36 10	86 47	549	9.57	0.17	37	.54	.14	43	.47	.06	48	.41	.98	59	.42	.99	69
New Haven	41 18	72 56	107	9.99	0.12	26	.96	.09	29	.86	.99	33	.85	.97	46	.88	.00	57
New London	41 21	72 5	47	0.05	0.10	29	.03	.08	30	.93	.98	35	.92	.97	46	.96	.01	56
New Orleans	29 58	90 4	52	0.11	0.16	54	.97	.12	59	.02	.07	62	.96	.01	69	.94	.99	75
New York	40 43	74 0	185	9.92	0.12	30	.90	.12	32	.80	.00	36	.78	.98	48	.81	.00	59
Norfolk	36 51	76 17	69	0.13	0.16	40	.11	.14	44	.01	.04	46	.97	.00	56	.90	.02	67
Northfield	44 10	72 41	871	9.07	0.07	18	.06	.06	20	.00	.98	27	.00	.96	38	.03	.97	53
North Platte	41 8	100 45	2,841	7.08	0.22	19	.07	.17	24	.05	.10	35	.01	.98	48	.01	.93	59
Olympia	47 3	122 53	36	9.99	0.03	38	.99	.03	38	.97	.01	44	.99	.03	48	.01	.05	54
Omaha	41 16	95 56	1,113	8.94	0.22	17	.91	.17	23	.86	.09	35	.78	.98	50	.78	.95	63
Oswego	43 29	76 35	335	9.70	0.09	24	.70	.09	25	.62	.00	29	.61	.99	42	.62	.99	55
Palestine	31 45	95 40	533	9.62	0.20	45	.56	.13	51	.51	.07	59	.44	.99	66	.44	.99	72
Pensacola	30 25	87 13	30	0.16	0.19	52	.13	.16	57	.07	.10	60	.01	.94	67	.99	.02	74
Philadelphia	39 57	75 9	117	0.02	0.16	31	.99	.13	34	.89	.02	39	.86	.99	50	.89	.02	62
Pike's Peak	38 50	105 2	14,134	7.49	.....	2	.51	.....	3	.56	.....	8	.63	.....	13	.79	.....	23
Pittsburgh	40 32	80 2	847	9.19	0.15	31	.18	.13	34	.10	.04	38	.08	.00	51	.10	.00	64
Poplar River	48 8	105 10	2,000	7.84	0.18	-2	.86	.17	4	.87	.08	26	.82	.98	41	.79	.89	54
Port Huron	43 0	82 26	639	9.36	0.10	20	.35	.08	23	.29	.02	27	.28	.99	41	.29	.98	53
Portland, Me.	43 39	70 15	99	9.93	0.05	23	.90	.01	26	.81	.92	32	.81	.92	44	.86	.97	55
Portland, Oregon	45 32	122 43	80	0.00	0.09	39	.99	.08	39	.95	.04	47	.96	.05	51	.96	.05	57
Prescott	34 33	112 28	5,389	4.72	0.15	35	.71	.11	38	.70	.06	43	.67	.97	49	.69	.91	58
Red Bluff	40 10	122 15	342	9.78	0.15	46	.74	.11	48	.68	.05	55	.65	.01	59	.59	.95	67
Rio Grande City	26 23	98 48	230	9.96	0.21	56	.89	.14	63	.82	.06	69	.74	.98	76	.78	.97	80
Rochester	43 8	77 42	621	9.38	0.09	23	.38	.09	25	.30	.00	29	.80	.99	42	.32	.98	57
Roseburgh	43 13	123 20	523	9.56	0.13	41	.54	.11	41	.51	.07	47	.51	.07	51	.51	.06	56
Sacramento	38 35	121 30	64	0.07	0.14	46	.04	.11	49	.99	.06	55	.95	.02	57	.89	.96	63
Saint Louis	38 38	90 12	571	9.53	0.16	29	.50	.13	35	.44	.06	43	.37	.97	56	.37	.96	66

APPENDIX No. 19—*Monthly normal pressure, etc.*—Continued.

Station.	Latitude.	Longitude.	Height.	January.			February.			March.			April.			May.		
				Pressure.		Temperature.	Pressure.		Temperature.	Pressure.		Temperature.	Pressure.		Temperature.	Pressure.		Temperature.
				Observed.	Reduced.		Observed.	Reduced.		Observed.	Reduced.		Observed.	Reduced.		Observed.	Reduced.	
	° ′	° ′		In.	In.	°	In.	In.	°	In.	In.	°	In.	In.	°	In.	In.	°
Saint Paul	44 58	93 3	831	9.16	0.13	9	.14	.10	16	.11	.04	28	.05	.95	45	.03	.91	59
Saint Vincent	48 56	97 14	804	9.21	0.18	7	.22	.18	0	.19	.12	14	.13	.02	35	.08	.94	53
Salt Lake City	40 46	111 54	4,348	5.68	0.25	29	.65	.20	32	.62	.10	41	.57	.00	48	.57	.93	58
San Antonio	29 27	98 28	781	9.33	0.17	50	.28	.12	55	.22	.05	62	.15	.97	68	.13	.95	74
San Diego	32 43	117 10	67	0.03	0.10	54	.02	.09	54	.00	.07	56	.96	.03	58	.91	.98	62
Sandusky	41 25	82 40	629	9.40	0.12	26	.39	.10	29	.33	.04	34	.31	.00	46	.32	.00	59
San Francisco	37 48	122 26	60	0.07	0.13	50	.04	.10	51	.02	.08	53	.98	.04	54	.94	.00	57
Santa Fé	35 41	105 57	7,026	3.23	0.17	27	.21	.09	32	.21	.02	39	.20	.95	45	.26	.91	55
Savannah	32 5	81 5	87	0.10	0.20	51	.07	.17	56	.00	.10	59	.95	.05	66	.94	.04	74
Shreveport	32 30	93 40	249	9.93	0.19	45	.88	.13	51	.81	.06	58	.74	.98	67	.74	.98	74
Sitka	34 40	98 23	1,200	8.89	0.17	34	.84	.11	41	.78	.03	50	.70	.93	61	.69	.92	69
Spokane	47 40	117 25	1,909	7.98	0.11	25	.99	.11	27	.96	.02	40	.95	.99	47	.95	.95	56
Springfield, Ill	39 48	89 39	644	9.45	0.17	26	.42	.13	32	.36	.06	40	.30	.99	53	.31	.99	64
Springfield, Mo	37 12	93 18	1,356	8.66	0.17	30	.63	.13	37	.59	.06	44	.54	.98	56	.55	.97	66
Sully	44 39	100 39	1,600	8.35	0.20	8	.34	.17	15	.31	.09	26	.26	.99	45	.21	.89	59
Toledo	41 40	83 34	673	9.38	0.11	25	.37	.09	29	.30	.02	34	.28	.98	47	.29	.98	60
Vicksburg	32 22	90 53	222	9.95	0.19	47	.91	.15	54	.84	.08	58	.78	.01	66	.77	.00	73
Washington	38 54	77 3	106	0.05	0.18	32	.02	.14	36	.92	.04	40	.87	.98	52	.91	.03	65
Wilmington	34 14	77 57	52	0.12	0.17	47	.09	.14	52	.00	.05	54	.96	.01	61	.97	.02	70
Winnemucca	40 58	117 43	4,344	5.66	0.20	30	.63	.15	32	.61	.06	41	.57	.98	47	.57	.93	55
Wood's Holl	41 33	70 40	85	0.04	0.08	29	.00	.04	31	.91	.95	34	.88	.92	45	.96	.00	55
Yankton	42 54	97 28	1,234	8.78	0.20	13	.76	.16	18	.72	.09	30	.64	.97	46	.62	.92	60
Yuma	32 45	114 36	141	9.93	0.08	53	.90	.05	57	.84	.99	64	.76	.91	69	.69	.84	77

APPENDIX No. 19.—*Monthly normal pressure, etc.*—Continued.

Station.	June.			July.			August.			September.			October.			November.			December.			Year.		
	Pressure.		Temperature.	Pressure.		Temperature.	Pressure.		Temperature.	Pressure.		Temperature.	Pressure.		Temperature.	Pressure.		Temperature.	Pressure.		Temperature.	Pressure.		Temperature.
	Observed.	Reduced.		Observed.	Reduced.		Observed.	Reduced.		Observed.	Reduced.		Observed.	Reduced.		Observed.	Reduced.		Observed.	Reduced.		Observed.	Reduced.	
	In.	In.	°	In.	In.	°	In.	In.	°	In.	In.	°	In.	In.	°	In.	In.	°	In.	In.	°	In.	In.	°
Abilene	8.15	9.92	80	.19	.96	82	.20	.97	80	.23	.01	74	.20	.08	64	.28	.14	52	.29	.18	45	.22	.04	63
Albany	9.87	9.95	69	.85	.93	73	.91	.99	71	.98	.07	64	.98	.07	52	.98	.07	40	.99	.08	29	.93	.02	49
Alpena	9.29	9.94	59	.30	.95	65	.34	.99	63	.36	.01	57	.36	.03	46	.33	.02	33	.33	.03	24	.32	.01	40
Apache	5.02	9.87	68	.08	.90	72	.08	.92	70	.07	.97	63	.06	.03	54	.06	.13	41	.05	.15	37	.04	.02	53
Assinaboine	7.11	9.86	63	.16	.88	68	.17	.91	65	.17	.96	54	.17	.02	42	.17	.09	29	.17	.15	19	.15	.01	41
Atlanta	8.89	0.05	75	.90	.07	78	.88	.04	76	.93	.10	72	.95	.14	63	.95	.17	51	.97	.20	44	.92	.11	61
Atlantic City	9.96	9.99	67	.95	.98	73	.98	.01	72	.05	.08	65	.06	.09	58	.06	.10	45	.08	.11	36	.02	.05	52
Augusta	9.85	0.04	78	.85	.04	81	.84	.03	79	.89	.08	75	.93	.12	66	.96	.16	54	.99	.19	48	.91	.10	64
Baltimore	9.95	0.00	73	.94	.98	77	.98	.03	74	.05	.10	69	.06	.11	58	.07	.12	46	.09	.14	37	.02	.07	55
Benton	7.15	9.89	63	.18	.90	70	.19	.93	68	.18	.97	56	.18	.04	44	.18	.11	29	.19	.17	24	.17	.00	43
Bismarck	8.12	9.86	65	.17	.90	69	.18	.92	67	.18	.95	56	.18	.00	43	.21	.08	26	.22	.14	12	.18	.01	39
Block Island	9.96	9.99	63	.94	.97	69	.98	.01	68	.05	.08	64	.08	.11	55	.03	.06	45	.03	.06	36	.00	.03	50
Boisé City	7.11	9.90	66	.13	.89	73	.12	.89	71	.17	.99	60	.23	.11	48	.29	.22	38	.27	.24	33	.18	.05	50
Boston	9.83	9.96	65	.82	.94	71	.87	.99	68	.94	.07	62	.93	.06	52	.90	.03	41	.91	.05	31	.87	.00	48
Brownsville	9.89	9.95	82	.93	.99	83	.90	.96	82	.91	.97	79	.98	.04	74	.04	.10	65	.06	.12	61	.96	.02	72
Buffalo	9.23	9.96	64	.23	.95	69	.27	.99	68	.32	.05	63	.30	.05	51	.28	.04	38	.28	.06	29	.27	.02	46
Buford	7.87	9.84	65	.93	.88	68	.94	.90	66	.95	.95	54	.96	.01	42	.97	.08	26	.00	.17	12	.94	.06	39
Cairo	9.61	9.97	75	.64	.99	79	.64	.99	78	.69	.05	71	.72	.09	60	.74	.11	47	.77	.15	38	.69	.06	58
Cedar Keys	0.02	0.04	80	.04	.06	82	.99	.01	82	.00	.02	79	.03	.05	73	.09	.11	63	.14	.16	57	.06	.08	70
Charleston	9.99	0.04	79	.99	.04	82	.97	.02	80	.01	.06	76	.05	.10	68	.08	.13	58	.11	.16	52	.04	.09	66
Charlotte	9.19	0.03	75	.20	.03	79	.19	.02	76	.25	.09	71	.26	.11	62	.27	.14	50	.28	.17	42	.23	.08	60
Chattanooga	9.23	0.04	75	.24	.04	77	.23	.03	76	.28	.09	71	.31	.13	62	.33	.16	49	.35	.19	41	.28	.10	60
Cheyenne	4.04	9.86	61	.12	.89	66	.12	.91	64	.09	.97	56	.04	.07	44	.99	.15	34	.93	.17	29	.00	.03	44
Chicago	9.20	9.95	66	.23	.98	72	.24	.99	71	.28	.04	65	.28	.05	53	.28	.06	39	.29	.08	29	.26	.03	48
Cincinnati	9.33	9.99	73	.35	.00	77	.36	.02	75	.41	.07	69	.43	.10	58	.43	.12	44	.45	.16	35	.39	.07	55
Cleveland	9.25	9.98	67	.26	.99	71	.28	.01	69	.33	.07	64	.33	.08	53	.32	.08	39	.32	.09	30	.29	.02	48
Columbus	9.14	9.98	70	.16	.00	75	.17	.01	72	.22	.06	67	.23	.09	55	.22	.11	41	.23	.14	32	.19	.06	53
Corpus Christi	9.96	9.98	82	.00	.02	83	.98	.00	82	.99	.01	79	.05	.07	73	.10	.12	62	.12	.14	56	.03	.05	70
Custer	6.77	9.85	64	.84	.89	71	.83	.88	70	.85	.97	57	.86	.04	46	.86	.12	32	.84	.16	22	.82	.01	44

APPENDIX No. 19—*Monthly normal pressure, etc.*—Continued.

Station.	June.			July.			August.			September.			October.			November.			December.			Year.		
	Pressure.		Temperature.	Pressure.		Temperature.	Pressure.		Temperature.	Pressure.		Temperature.	Pressure.		Temperature.	Pressure.		Temperature.	Pressure.		Temperature.	Pressure.		Temperature.
	Observed.	Reduced.		Observed.	Reduced.		Observed.	Reduced.		Observed.	Reduced.		Observed.	Reduced.		Observed.	Reduced.		Observed.	Reduced.		Observed.	Reduced.	
	In.	In.	°	In.	In.	°	In.	In.	°	In.	In.	°	In.	In.	°	In.	In.	°	In.	In.	°	In.	In.	°
Davenport	9.30	9.95	70	.34	.99	75	.35	.00	72	.38	.04	65	.40	.07	53	.41	.09	38	.44	.13	26	.37	.04	49
Davis	5.21	9.94	75	.26	.99	75	.26	.01	72	.26	.04	68	.27	.12	60	.25	.18	50	.23	.20	45	.22	.07	60
Deadwood	5.37	9.88	60	.44	.91	65	.44	.91	64	.43	.99	54	.39	.04	44	.35	.14	32	.30	.18	24	.35	.02	42
Denver	4.74	9.84	67	.82	.87	72	.82	.89	70	.81	.96	62	.78	.06	50	.75	.18	37	.70	.18	33	.78	.01	50
Des Moines	9.03	9.92	70	.08	.97	74	.09	.98	72	.11	.01	64	.14	.06	52	.15	.10	36	.18	.15	24	.11	.03	48
Detroit	9.26	9.96	67	.28	.98	72	.31	.01	70	.35	.06	64	.34	.06	53	.33	.06	40	.34	.08	30	.31	.03	49
Dodge City	7.34	9.88	73	.40	.03	77	.41	.95	74	.42	.99	67	.43	.05	55	.44	.13	39	.44	.18	30	.39	.02	52
Dubuque	9.24	9.94	69	.27	.97	73	.30	.00	71	.32	.03	63	.33	.05	51	.34	.08	35	.36	.11	24	.31	.03	47
Duluth	9.20	9.92	58	.21	.92	66	.24	.96	64	.25	.98	55	.26	.00	45	.28	.03	29	.30	.08	16	.26	.00	38
Eastport	9.87	9.93	56	.86	.92	61	.91	.97	61	.97	.03	56	.95	.01	47	.91	.97	37	.91	.97	26	.90	.96	42
Elliott	7.20	9.90	73	.26	.94	77	.27	.96	75	.29	.00	68	.29	.06	57	.29	.14	42	.28	.16	34	.25	.03	55
El Paso	6.19	9.86	80	.24	.91	82	.25	.93	79	.26	.97	72	.27	.05	62	.30	.15	50	.30	.19	45	.25	.03	62
Erie	9.25	6.96	66	.26	.97	71	.29	.00	69	.34	.06	64	.33	.06	53	.31	.05	40	.31	.07	31	.29	.02	49
Escanaba	9.27	9.92	61	.29	.93	66	.32	.97	63	.34	.95	57	.34	.01	45	.33	.01	30	.34	.03	21	.32	.99	40
Fort Smith	9.47	9.95	76	.50	.98	80	.49	.97	79	.53	.02	73	.58	.08	62	.61	.12	48	.63	.16	40	.54	.04	60
Galveston	9.95	9.99	82	.99	.03	84	.95	.99	83	.96	.00	80	.03	.07	73	.08	.12	62	.10	.14	57	.01	.05	70
Grand Haven	9.29	9.95	64	.32	.97	68	.34	.99	66	.37	.03	62	.36	.03	50	.35	.03	38	.36	.05	29	.34	.01	47
Grant	5.21	9.89	75	.26	.92	77	.25	.94	74	.25	.97	70	.24	.02	62	.26	.14	51	.25	.17	45	.23	.03	60
Hatteras	0.02	0.03	74	.02	.03	78	.01	.02	77	.06	.07	75	.08	.09	66	.10	.11	56	.12	.14	47	.06	.07	61
Helena	5.82	9.90	60	.88	.91	67	.87	.90	67	.87	.99	55	.86	.06	43	.86	.14	31	.83	.17	23	.83	.03	43
Huron	8.53	9.90	67	.58	.94	70	.59	.95	68	.61	.00	58	.61	.03	46	.65	.11	29	.68	.19	15	.61	.04	42
Indianapolis	9.18	9.99	72	.21	.01	76	.22	.03	73	.26	.07	67	.27	.10	55	.27	.11	41	.28	.14	31	.23	.06	52
Jacksonville	0.00	0.04	80	.01	.05	82	.98	.02	81	.99	.03	78	.03	.07	71	.08	.12	62	.12	.16	56	.04	.08	69
Keokuk	9.29	9.94	72	.33	.97	77	.34	.99	74	.38	.03	67	.40	.07	54	.41	.09	40	.44	.13	31	.36	.03	52
Key West	0.02	0.04	83	.04	.06	85	.99	.01	84	.97	.99	83	.97	.99	79	.04	.06	74	.10	.12	70	.03	.05	78
Knoxville	9.03	0.03	73	.05	.05	76	.04	.04	75	.09	.10	70	.11	.14	60	.12	.18	47	.13	.20	38	.07	.10	58
La Crosse	9.14	9.92	69	.17	.05	73	.20	.98	70	.22	.01	62	.22	.02	50	.24	.06	34	.26	.10	22	.21	.01	46
Las Animas	6.01	9.86	71	.07	.89	77	.08	.92	73	.07	.96	64	.06	.04	51	.06	.16	35	.04	.18	29	.03	.02	50

Leavenworth	9.07	9.94	73	.11	.97	77	.12	.99	75	.15	.02	68	.18	.07	56	.20	.12	41	.24	.18	30	.15	.04	53
Little Rock	9.66	9.98	77	.69	.01	80	.68	.00	79	.73	.06	78	.77	.10	64	.80	.14	51	.82	.17	43	.74	.07	62
Los Angeles	9.58	9.94	66	.58	.94	69	.55	.91	70	.65	.91	68	.62	.98	62	.68	.04	58	.71	.08	55	.63	.99	61
Louisville	9.41	9.99	74	.43	.00	78	.44	.01	76	.50	.08	70	.52	.11	59	.53	.13	46	.55	.17	38	.48	.07	57
Lynchburgh	9.34	0.02	74	.33	.00	78	.35	.03	75	.41	.09	70	.42	.11	59	.43	.14	46	.44	.16	38	.38	.08	57
Maginnis	5.55	9.90	58	.62	.93	64	.62	.94	62	.59	.00	51	.57	.07	41	.53	.12	32	.49	.18	22	.53	.03	41
Marquette	9.22	9.94	58	.23	.95	65	.27	.99	62	.27	.99	56	.26	.00	45	.26	.01	31	.26	.03	22	.20	.00	40
Memphis	9.66	9.99	78	.69	.02	81	.68	.01	79	.73	.07	73	.77	.11	63	.79	.14	50	.82	.18	42	.78	.07	61
Milwaukee	9.21	9.96	62	.24	.98	69	.26	.00	67	.29	.04	61	.28	.04	50	.28	.05	36	.29	.08	25	.26	.03	44
Mobile	9.99	0.02	80	.01	.04	81	.98	.01	80	.00	.03	77	.05	.08	69	.10	.14	57	.13	.17	52	.05	.08	67
Montgomery	9.80	0.03	79	.81	.04	81	.79	.01	80	.82	.05	76	.87	.10	67	.92	.16	55	.94	.18	49	.86	.10	65
Moorhead	8.90	9.87	65	.95	.91	68	.97	.94	65	.97	.96	55	.98	.00	42	.03	.08	24	.06	.15	8	.99	.02	37
Mount Washington	8.82	9.93	44	.87	.93	48	.90	.99	46	.87	.03	41	.74	.04	30	.54	.02	18	.43	.04	10	.64	.00	26
Nashville	9.42	9.99	75	.44	.00	78	.44	.00	77	.49	.06	71	.52	.10	62	.54	.13	48	.56	.16	40	.48	.06	59
New Haven	9.87	9.99	66	.85	.97	71	.90	.02	69	.97	.09	64	.96	.08	52	.95	.07	41	.96	.09	31	.92	.04	49
New London	9.94	9.99	65	.92	.97	71	.97	.02	69	.03	.08	64	.03	.08	54	.01	.06	43	.02	.07	33	.98	.03	50
New Orleans	9.95	0.00	81	.98	.03	82	.95	.00	82	.96	.01	78	.01	.06	71	.07	.12	60	.09	.14	55	.01	.06	69
New York	9.80	9.99	68	.79	.98	73	.83	.02	71	.90	.09	66	.90	.09	56	.88	.08	44	.90	.10	34	.85	.05	51
Norfolk	9.99	0.02	74	.98	.01	79	.99	.02	76	.06	.09	72	.08	.11	63	.09	.12	51	.11	.14	43	.04	.07	59
Northfield	9.01	9.93	62	.03	.94	70	.07	.98	67	.13	.05	60	.10	.04	48	.07	.04	35	.06	.05	23	.05	.01	43
North Platte	7.03	9.90	68	.09	.94	73	.10	.96	71	.11	.01	62	.11	.07	50	.11	.16	34	.10	.20	25	.07	.05	47
Olympia	0.00	0.04	59	.02	.06	62	.98	.02	62	.00	.04	56	.02	.06	49	.03	.07	44	.00	.04	41	.00	.04	50
Omaha	8.78	9.93	72	.83	.97	76	.84	.99	73	.86	.03	65	.89	.08	53	.91	.14	37	.94	.20	24	.86	.06	49
Oswego	9.60	9.96	63	.68	.96	69	.64	.00	67	.70	.06	62	.69	.06	50	.67	.05	39	.68	.06	29	.65	.02	46
Palestine	9.45	9.99	79	.49	.03	81	.47	.01	80	.50	.05	75	.54	.09	66	.58	.15	55	.60	.17	49	.52	.08	65
Pensacola	0.00	0.03	80	.02	.05	81	.98	.01	81	.00	.03	78	.05	.08	70	.10	.13	59	.14	.16	51	.05	.08	67
Philadelphia	9.87	0.00	71	.86	.99	76	.90	.03	73	.97	.10	68	.98	.11	57	.98	.11	45	.99	.13	35	.93	.06	53
Pike's Peak	7.95	.....	33	.08	.....	40	.06	.....	38	.96	.....	31	.81	.....	21	.66	.....	11	.56	.....	7	.76	.....	19
Pittsburgh	9.10	9.99	70	.11	.99	74	.13	.02	72	.19	.08	67	.19	.09	56	.18	.11	43	.18	.13	34	.14	.05	53
Poplar River	7.77	9.84	65	.82	.87	68	.85	.91	66	.85	.95	55	.86	.02	39	.87	.09	24	.89	.19	6	.84	.01	37
Port Huron	9.28	9.96	63	.29	.96	68	.32	.99	67	.36	.04	61	.36	.05	50	.34	.05	36	.34	.07	26	.32	.02	45
Portland, Me	9.83	9.94	64	.81	.92	69	.87	.98	67	.94	.05	60	.93	.04	50	.90	.01	39	.90	.02	29	.87	.98	47
Portland, Oreg	9.96	0.05	62	.95	.03	66	.93	.02	64	.94	.03	60	.99	.08	52	.01	.10	44	.99	.08	42	.97	.06	52
Prescott	4.73	9.87	67	.79	.88	72	.79	.90	70	.77	.95	63	.76	.03	53	.75	.11	42	.74	.13	39	.74	.01	52
Red Bluff	9.54	0.00	75	.52	.87	82	.51	.86	80	.56	.92	72	.66	.02	62	.75	.12	52	.77	.14	48	.65	.01	62
Rio Grande City	9.75	9.99	85	.77	.00	86	.75	.99	84	.78	.02	81	.86	.10	74	.91	.16	64	.93	.18	59	.82	.06	74
Rochester	9.30	9.96	65	.30	.95	69	.35	.00	67	.39	.05	62	.39	.06	50	.36	.05	38	.36	.06	28	.34	.02	46
Roseburgh	9.51	0.06	61	.50	.04	66	.47	.02	65	.49	.04	60	.55	.11	51	.57	.14	44	.55	.12	43	.52	.03	52
Sacramento	9.84	9.92	68	.82	.89	72	.80	.87	71	.87	.94	69	.94	.01	60	.03	.10	52	.06	.13	48	.94	.01	59
Saint Louis	9.37	9.96	74	.41	.99	79	.41	.99	77	.46	.05	70	.48	.08	58	.50	.12	44	.52	.15	34	.45	.06	55
Saint Paul	9.03	9.90	67	.06	.93	71	.08	.95	69	.09	.97	59	.10	.99	48	.11	.04	30	.14	.09	18	.09	.99	43
Saint Vincent	9.04	9.89	63	.06	.91	65	.08	.93	62	09	.95	53	.12	.00	40	.17	.09	20	.20	.15	5	.13	.02	33
Salt Lake City	5.59	9.88	68	.63	.87	75	.63	.88	74	.65	.96	64	.68	.09	51	.72	.23	37	.71	.24	34	.64	.05	51

APPENDIX No. 19—*Monthly normal pressure, etc.*—Continued.

Station.	June.			July.			August.			September.			October.			November.			December.			Year.		
	Pressure.		Temperature.	Pressure.		Temperature.	Pressure.		Temperature.	Pressure.		Temperature.	Pressure.		Temperature.	Pressure.		Temperature.	Pressure.		Temperature.	Pressure.		Temperature.
	Observed.	Reduced.		Observed.	Reduced.		Observed.	Reduced.		Observed.	Reduced.		Observed.	Reduced.		Observed.	Reduced.		Observed.	Reduced.		Observed.	Reduced.	
	In.	*In.*	°	*In.*	*In.*	°	*In.*	*In.*	°	*In.*	*In*	°	*In.*	*In.*	°	*In.*	*In.*	°	*In.*	*In.*	°	*In.*	*In.*	°
San Antonio	9.14	9.95	81	.19	.00	83	.17	.98	82	.20	.01	77	.25	.07	69	.30	.13	58	.31	.15	56	.22	.04	68
San Diego	9.88	9.95	64	.88	.95	67	.85	.92	69	.85	.92	66	.92	.99	62	.98	.05	58	.01	.08	56	.94	.01	60
Sandusky	9.31	9.98	68	.32	.99	73	.34	.01	70	.39	.06	66	.39	.08	54	.37	.07	40	.39	.10	30	.36	.05	49
San Francisco	9.90	9.96	58	.90	.96	59	.88	.94	58	.89	.95	60	.96	.02	58	.04	.10	55	.06	.12	52	.97	.08	56
Santa Fé	8.32	9.89	64	.41	.94	68	.41	.97	65	.38	.99	59	.34	.04	60	.30	.13	37	.25	.15	31	.30	.02	48
Savannah	9.95	0.04	80	.96	.05	82	.94	.03	80	.97	.06	76	.01	.11	68	.05	.15	58	.08	.18	52	.00	.10	67
Shreveport	9.75	9.99	81	.78	.02	83	.76	.00	82	.80	.04	76	.85	.09	66	.89	.14	54	.91	.16	48	.82	.07	65
Sill	8.71	9.93	77	.76	.98	82	.76	.98	80	.79	.01	73	.82	.05	61	.86	.11	48	.87	.14	40	.79	.02	60
Spokane	7.94	9.92	63	.96	.92	69	.94	.91	67	.98	.98	57	.02	.06	46	.05	.14	35	.02	.12	30	.98	.02	47
Springfield, Ill	9.30	9.97	72	.34	.00	76	.35	.02	74	.39	.06	67	.41	.09	56	.41	.11	42	.44	.15	31	.37	.06	53
Springfield, Mo	8.57	9.97	73	.60	.99	76	.60	.00	75	.63	.04	68	.65	.09	58	.65	.12	44	.65	.15	34	.61	.06	55
Sully	8.21	9.86	68	.27	.91	73	.29	.94	68	.30	.99	57	.31	.03	46	.34	.11	30	.36	.17	18	.30	.03	43
Toledo	9.28	9.96	69	.30	.98	74	.32	.00	70	.36	.05	65	.36	.06	53	.35	.06	40	.37	.09	30	.33	.03	50
Vicksburg	9.79	0.02	79	.82	.05	81	.79	.02	80	.82	.05	75	.88	.11	67	.92	.16	55	.94	.18	50	.85	.09	65
Washington	9.89	0.01	72	.88	.99	76	.92	.04	74	.99	.11	69	.00	.12	58	.01	.13	45	.03	.16	35	.96	.08	55
Wilmington	9.98	0.03	76	.98	.03	80	.97	.02	78	.02	.07	74	.05	.10	66	.08	.13	55	.10	.16	49	.03	.08	64
Winnemucca	5.58	9.88	63	.61	.85	72	.60	.86	70	.63	.95	60	.66	.07	47	.69	.20	35	.69	.21	33	.62	.02	49
Wood's Holl	9.92	9.96	64	.93	.97	70	.96	.00	68	.03	.07	63	.01	.05	54	.01	.05	45	.01	.05	34	.97	.01	49
Yankton	8.62	9.90	69	.66	.93	73	.68	.95	71	.69	.98	62	.71	.03	50	.74	.11	33	.77	.17	20	.70	.04	45
Yuma	9.63	9.78	84	.66	.80	91	.64	.78	90	.66	.81	83	.76	.91	71	.87	.02	60	.91	.06	56	.77	.92	72

APPENDIX No. 20.

Table of monthly and annual mean temperature for 1887—Voluntary—State weather service—Military posts and Central and Southern Pacific Railroad stations.

[NOTE.—Letters of alphabet denote number of days missing from the record. References: S. W. S.—Observers reporting to State weather services. V. O.—Observers reporting direct to Chief Signal Officer. M. P.—Assistant surgeons reporting through the Surgeon-General, U. S. A. R. R.—Observers reporting to headquarters of Central and Southern Pacific Railway system. N. E. M. S.—Observers reporting to New England Meteorological Society.]

States and stations.	Character of stations.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Annual.	Authority.
Alabama:															
Auburn	S. W. S.	42.9	57.0	55.2	64.6	74.0	.....	83.2	77.4	71.7	61.7	55.0	46.3	.....	W. D. Dunlap.
Bermuda	S. W. S.	46.4	63.5	57.2	64.8	74.0	78.7	80.2	.....	75.7	63.5	54.9	48.0	.....	W. Fowler.
Carrollton	S. W. S.	42.4	56.3	58.2	60.0	73.7	77.9	80.2	72.8	74.2	61.1	55.6	41.1	63.3	M. L. Stansel.
Demopolis	S. W. S.	45.0	60.4	.....	67.5	.....	80.4	82.5	80.0	77.2	64.3	42.1	.....	.....	W. W. Legare.
Eufaula	S. W. S.	41.8	58.8	55.0	62.5	72.9	77.0	80.0	.....	.....	.....	.....	.....	.....	J. Milton.
Fayette	S. W. S.	41.0	.....	51.0	54.2	72.8	81.7	83.9	79.5	98.6	.....	44.0	.....	.....	T. P. McConnell.
Florence	S. W. S.	39.0	52.4	50.4	62.6	72.8	77.6	78.6	77.0	67.2	59.3	51.0	41.4	60.8	J. W. Milner.
Gadsden	S. W. S.	39.2	51.4	47.9	57.0	66.2	74.7	77.5	75.9	69.6	55.1	47.6	42.1	58.7	D. P. Goodhue.
Greensborough	V. O.	45.0	59.4	58.0	66.3	72.0	.....	81.0	.....	.....	.....	.....	.....	.....	Mrs. M. T. Wright.
Greenville	S. W. S.	44.0	61.5	.....	67.8	77.9	.....	81.3	.....	78.5	68.8	54.3	49.2	.....	F. C. Persons and J. C. Seale.
Livingston	V. O.	45.0	59.0	56.2	65.8	75.0	.....	.....	79.4	76.6	62.7	52.8	45.6	.....	J. W. A. Wright.
Marion	S. W. S.	44.6	56.6	55.0	64.1	73.0	79.8	80.5	.....	71.8	66.1	.....	.....	.....	A. D. Smith.
Mount Willing	S. W. S.	42.5	58.7	56.0	62.5	73.3	79.0	81.5	.....	.....	.....	.....	48.0	.....	W. M. Garrett.
Newton	S. W. S.	46.2	.....	59.9	66.3	78.2	.....	.....	.....	77.2	.....	57.3	49.9	.....	C. L. McCartha.
Oswichee	S. W. S.	.....	57.9	.....	.....	77.5	80.7	81.7	82.6	78.0	64.9	59.0	48.0	.....	W. C. Whitaker.
Selma	S. W. S.	45.0	57.0	50.9	61.6	75.7	79.7	79.5	.....	.....	.....	.....	.....	.....	Miss S. V. A. Hunt.
Trinity	S. W. S.	41.3	53.6	53.2	64.4	73.9	76.3	.....	.....	.....	61.4	56.8	41.8	.....	J. Shackelford.
Tuscaloosa	S. W. S.	43.9	57.5	56.6	64.4	75.1	79.3	82.6	81.4	78.1	65.0	57.0	48.7	65.8	J. C. Perkins.
Tuscumbia	S. W. S.	40.2	53.4	50.8	62.3	68.9	75.2	85.6	72.9	93.0	46.6	49.1	42.2	61.7	L. B. Thornton.
Union Springs	S. W. S.	45.4	60.5	52.8	66.0	76.3	82.0	83.0	.....	75.4	.....	58.0	46.0	.....	C. M. Franklin.
Do	S. W. S.	.....	.....	.....	.....	74.2	80.0	78.0	.....	74.0	63.0	54.6	61.0	.....	Rev. J. L. Moultrie.
Valley Head	S. W. S.	34.8	50.0	.....	58.4	69.2	83.9	72.3	.....	70.4	54.3	45.9	39.5	.....	E. P. Nicholson.
Arizona:															
Benson	R. R.	45.5	49.5	60.2	64.2	75.6	85.1	82.8	81.5	78.6	61.7	53.6	40.0	64.9	Pacific Railway system.
Casa Grande	R. R.	52.0	56.6	69.5	71.8	80.5	92.2	93.4	93.4	88.0	74.7	63.6	49.0	73.7	Do.
Huachuca, Fort	M. P.	46.3	.....	50.1	.....	.....	82.6	.....	.....	66.5	61.5	54.2	37.7	.....	U. S. Post Hospital.
McDowell, Fort	M. P.	49.4	51.8	65.3	68.6	79.8	89.6	92.6	91.6	86.6	70.5	60.3	46.0	71.0	Do.
Maricopa	R. R.	51.2	55.5	69.1	73.2	88.5	90.2	93.0	93.3	82.9	73.5	66.2	53.9	74.2	Pacific Railway system.
Mojave, Fort	M. P.	.....	52.6	65.8	71.2	80.6	89.5	92.7	90.0	83.8	75.6	63.0	50.5	.....	U. S. Post Hospital.
Pantano	R. R.	.....	.....	74.7	68.9	.....	83.3	84.7	83.4	81.2	73.9	61.6	43.7	.....	Pacific Railway system.
San Simon	R. R.	44.5	50.2	57.4	64.0	75.9	86.2	85.5	85.4	81.2	71.2	50.5	.....	.....	Do.
Texas Hill	R. R.	51.1	53.6	69.6	70.1	82.6	92.9	99.0	97.5	87.6	75.8	61.5	48.7	74.2	Do.
Do	R. R.	52.1	52.1	67.0	70.1	87.9	91.1	90.9	89.0	86.2	81.4	67.1	54.6	74.1	Do.
Wilcox	R. R.	47.2	47.2	56.6	60.0	67.6	81.9	82.1	79.0	73.4	63.8	53.1	37.7	62.5	Do.
Yuma	R. R.	58.6	58.5	72.9	74.2	81.3	89.7	99.5	95.4	88.7	78.5	66.1	53.8	76.4	Do.

Table of monthly and annual mean temperature for 1887—Voluntary—State weather service—Military posts and Central and Southern Pacific Railroad stations—Continued.

States and stations.	Character of stations.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Annual.	Authority.
Arkansas:															
Alexander	S. W. S.	.....	.....	.....	.....	73.1	78.4	83.2	80.5	75.1	59.4	48.5	38.9	.....	P. Williams, Isaiah Williams.
Brinkley	S. W. S.	41.0	50.9	60.5	67.6	76.8	80.6	85.2	82.4	78.2	.....	.....	.....	.....	Jno. Flynn, C. A. Potter.
Conway	S. W. S.	37.4	46.2	53.7	61.8	69.6	74.6	78.1	78.0	73.3	57.2	45.0	35.6	59.2	A. P. Robinson, C. E.
Dallas	S. W. S.	.....	.....	.....	.....	77.3	81.9	85.9	84.0	84.1	[a]57.7	59.0	41.9	.....	Thomas M. Carden.
Eureka Springs	S. W. S.	37.9	44.1	52.8	61.6	68.1	74.1	76.7	74.6	67.8	56.2	49.1	34.1	58.1	A. H. Foote.
Forrest City	S. W. S.	.....	.....	.....	.....	[a]66.0	78.5	[a]76.5	78.0	72.0	64.3	.....	.....	.....	W. J. Prude, George Owens.
Heber	S. W. S.	.....	.....	.....	.....	.....	[b]79.9	86.9	83.7	75.4	63.2	50.1	40.6	.....	D. Reeder, M. D.
Helena	S. W. S.	.....	.....	[a]54.6	[c]65.2	[c]70.0	72.2	82.0	80.4	74.9	61.4	.....	42.3	.....	George Warren.
Hot Springs	M. P.	.....	49.2	55.4	64.2	73.0	76.6	80.5	79.0	75.0	58.3	51.6	40.1	.....	U. S. Post Hospital.
Lead Hill	V. O.	34.3	43.3	51.4	64.0	70.7	76.3	82.8	78.0	72.8	57.1	46.6	35.0	59.4	Silas C. Turnbo.
Newport	S. W. S.	.....	.....	.....	.....	72.0	75.8	79.9	76.3	69.9	59.4	.....	.....	.....	J. M. Thompson.
Osceola	S. W. S.	.....	[b]53.1	.....	[c]65.1	71.9	[d]77.0	[c]84.3	79.1	.....	61.3	44.7	.....	.....	Dr. D. A. Richardson.
Pine Bluff	S. W. S.	35.5	.....	.....	.....	.....	79.8	[a]82.8	81.5	76.7	[a]62.6	.....	.....	.....	H. B. Mizell, W. E. McEwen.
Prescott	S. W. S.	.....	.....	[a]	.....	.....	78.7	81.8	80.5	75.2	63.2	52.6	.....	.....	William Friganza.
Russellville	S. W. S.	37.8	48.1	54.4	62.3	72.8	76.8	82.3	80.0	74.6	60.2	.....	.....	.....	W. B. McDonald.
Springdale	S. W. S.	[1]45.4	45.0	58.1	65.5	.....	79.0	82.9	.....	.....	.....	.....	.....	.....	Jno. B. Gill.
Texarkana	S. W. S.	.....	.....	.....	.....	71.0	[e]73.2	80.5	79.8	77.2	68.2	50.8	34.9	.....	M. J. Nash.
Washington	S. W. S.	.....	.....	.....	.....	[b]74.6	77.4	81.2	79.9	76.8	63.3	54.0	42.1	.....	A. H. Carrigan.
California:															
Alcatraz Island	M. P.	50.7	.....	52.2	52.8	54.0	55.8	53.8	54.4	56.8	60.0	54.3	51.2	.....	U. S. Post Hospital.
Almaden	R. R.	50.7	47.1	56.5	56.5	62.6	68.2	68.8	67.1	69.5	65.6	56.1	50.7	60.0	Pacific Railway system.
Anaheim	R. R.	54.0	53.3	58.9	61.0	63.4	65.8	72.3	71.2	71.7	70.6	61.4	53.8	63.1	Do.
Anderson	V. O.	49.3	45.0	59.6	64.9	66.0	76.6	76.0	72.5	59.4	58.5	49.5	.....	.....	Dr. A. Fouch.
Angel Island	M. P.	51.9	47.0	56.5	55.4	59.4	62.1	59.2	75.7	58.9	63.5	68.4	53.6	59.3	U. S. Post Hospital.
Antioch	R. R.	49.8	47.1	59.0	62.3	68.2	73.6	74.8	73.6	73.3	68.4	57.0	49.2	63.0	Pacific Railway system.
Aptos	R. R.	49.1	47.0	55.5	55.7	58.9	68.4	61.0	60.1	60.1	59.6	54.5	40.2	56.2	Do.
Athlone	R. R.	50.5	45.8	58.9	62.1	71.4	78.7	83.2	79.4	75.3	67.1	54.9	45.5	64.4	Do.
Auburn	R. R.	44.9	39.8	54.5	55.4	63.1	71.3	76.0	72.5	71.0	67.1	53.4	44.8	59.5	Do.
Benicia Barracks	M. P.	49.7	45.0	56.1	57.4	60.8	65.9	64.8	65.1	67.6	66.6	55.4	49.1	58.6	U. S. Post Hospital.
Bidwell, Fort	M. P.	34.1	25.8	45.2	46.4	56.8	61.7	72.1	68.5	61.6	53.2	44.1	32.5	50.2	Do.
Bishop Creek	R. R.	44.7	41.5	62.5	63.9	72.1	82.6	87.6	82.0	67.2	64.9	50.0	44.3	63.6	Pacific Railway system.
Boca	R. R.	27.4	21.4	34.3	42.9	51.8	56.4	64.9	63.5	55.9	49.6	33.5	22.4	43.7	Do.
Borden	R. R.	47.2	46.9	59.0	61.8	72.9	79.2	81.4	79.2	76.5	68.3	55.8	46.6	64.5	Do.
Brentwood	R. R.	49.2	46.7	60.8	64.3	67.8	77.9	80.3	79.6	75.9	63.5	52.8	47.2	63.8	Do.
Brighton	R. R.	50.9	47.6	59.5	62.8	68.8	77.9	79.9	76.2	76.8	70.4	57.7	49.5	64.8	Do.
Byron	R. R.	48.1	46.8	62.5	65.3	74.5	83.7	84.8	76.5	74.5	.....	54.5	48.3	.....	Do.
Caliente	R. R.	50.4	47.5	59.0	58.7	68.1	77.6	86.0	83.1	74.3	68.2	56.6	46.8	64.7	Do.
Calistoga	R. R.	47.5	43.3	55.7	59.5	63.6	70.2	70.9	65.8	67.4	65.5	51.8	49.4	59.2	Do.

Chico	R. R.	50.5	45.0	60.0	65.0	72.7	80.6	88.3	80.1	77.7	70.5	55.0	48.5	66.2	Do.
Chualar	R. R.	.....	51.0	60.0	59.6	64.7	.....	.....	.....	.....	.....	.....	.....	.....	Do.
Cisco	R. R	29.5	24.4	36.4	38.6	47.9	55.3	60.4	57.9	55.8	51.9	41.2	32.1	44.4	Do.
Colfax	R. R.	45.0	36.8	54.7	54.4	62.3	69.5	75.5	71.7	69.0	65.9	53.9	42.4	58.4	Do.
Colton	R. R.	56.8	51.1	64.3	60.3	68.4	74.8	78.5	76.9	73.8	65.6	57.1	49.3	64.7	Do.
Corning	R. R.	48.7	44.0	55.7	59.8	68.7	78.3	87.3	80.1	75.7	70.1	54.0	48.2	64.2	Do.
Davis	R. R.	50.2	47.6	61.1	62.1	68.7	75.4	74.4	74.1	70.6	69.0	55.5	49.0	63.1	Do.
Delano	R. R.	46.4	48.5	58.4	66.3	74.7	82.7	91.0	88.2	85.0	72.0	64.9	50.7	69.1	Do.
Delta	R. R.	41.2	34.9	50.8	52.6	64.1	70.4	73.9	.....	.....	61.0	47.7	39.4	.....	Do.
Dunnigan	P. R.	51.0	46.1	63.6	64.6	71.7	79.7	79.3	77.8	73.8	67.9	56.8	48.8	65.1	Do.
Emmira	R. R.	53.8	47.5	59.9	63.2	66.6	73.0	71.8	71.4	72.8	68.6	55.4	49.8	63.0	Do.
Emigrant Gap	R. R.	38.6	30.8	48.3	45.9	53.8	61.5	68.0	66.9	61.9	57.9	47.1	38.4	51.6	Do.
Fall Brook	V. O.	50.9	48.5	56.9	57.9	61.0	66.2	60.3	67.1	66.6	69.5	56.0	49.8	59.2	F. E. Fox.
Farmington	R. R.	45.9	46.1	61.8	60.5	67.6	74.8	77.8	75.4	74.1	69.2	61.3	45.8	63.4	Pacific Railway system.
Fresno City	R. R.	47.8	49.3	62.7	63.6	72.4	79.6	87.5	82.6	75.5	70.3	60.9	48.8	66.8	Do.
Galt	R. R.	50.5	45.4	60.5	58.6	75.4	81.7	79.8	77.9	.....	63.4	60.8	52.1	.....	Do.
Gaston, Fort	M. P.	.....	.....	51.4	53.7	60.1	66.1	94.0	69.3	65.1	.....	46.8	43.5	.....	U. S. Post Hospital.
Gilroy	R. R.	47.7	46.8	56.5	56.9	62.4	66.6	65.0	63.7	67.9	64.1	52.7	46.3	58.0	Pacific Railway system.
Goshen	R. R.	46.1	47.1	63.7	64.3	73.2	85.6	88.7	85.3	82.4	71.3	57.5	44.4	67.5	Do.
Hollister	R. R.	51.2	49.0	59.8	59.4	65.5	68.0	64.9	62.4	65.0	62.1	56.1	52.2	59.7	Do.
Indio	R. R.	54.1	59.5	76.6	72.8	79.4	90.0	95.7	94.7	87.9	74.9	62.9	54.1	75.2	Do.
Ione	R. R.	44.8	44.9	54.9	57.6	63.7	73.4	76.3	75.6	71.9	61.1	50.6	45.1	60.0	Do.
Keeler	R. R.	43.6	40.1	59.0	59.2	68.0	76.3	82.5	80.7	73.3	63.6	51.8	42.7	61.7	Do.
Keene	R. R.	45.6	41.5	52.0	50.7	60.5	67.1	75.5	64.2	64.7	62.5	55.0	43.4	56.9	Do.
Kings City	R. R.	49.7	44.6	61.4	58.9	65.6	66.4	69.4	64.8	64.8	62.4	54.6	44.4	58.9	Do.
Kingsburgh	R. R.	44.3	45.4	59.6	61.1	69.5	77.4	84.5	80.7	75.7	64.3	52.3	43.0	63.2	Do.
Knight's Landing	R. R.	54.8	45.8	48.3	53.1	61.3	69.1	73.7	72.8	67.5	65.7	56.8	46.3	59.6	Do.
Lathrop	R. R.	46.4	44.6	56.9	57.9	65.7	72.8	74.9	71.9	70.3	63.2	52.1	46.6	60.3	Do.
Lemoore	R. R.	46.9	49.3	62.9	61.0	69.6	78.1	84.0	79.8	73.7	70.9	55.4	45.0	64.7	Do.
Lewis Creek	V. O.	.....	.....	.....	.....	.....	79.8	86.2	82.2	78.7	72.0	60.0	46.0	.....	John Tuohy.
Livermore	R. R.	52.1	45.7	57.3	56.1	60.5	65.9	66.3	66.4	67.1	66.4	57.3	52.5	59.5	Pacific Railway system.
Livingston	R. R.	53.6	52.9	66.1	65.5	73.9	81.2	84.8	79.1	79.1	70.2	60.9	49.6	68.1	Do.
Los Angeles	R. R.	.....	52.3	59.4	61.1	65.2	69.7	71.8	69.4	69.4	66.3	58.8	52.7	.....	Do.
Mammoth Tank	R. R.	57.7	58.0	78.4	80.4	91.2	100.2	.....	90.4	88.4	80.4	65.8	51.0	.....	Do.
Martinez	R. R.	48.0	44.6	58.6	57.1	60.8	67.5	66.7	61.3	62.9	62.4	54.2	50.3	57.4	Do.
Marysville	R. R.	48.5	42.5	54.9	57.9	71.4	75.6	74.1	71.3	69.4	67.1	58.6	53.3	62.0	Do.
Mason, Fort	M. P.	51.7	47.8	53.9	55.2	57.3	60.3	57.5	57.9	60.0	61.6	56.8	52.0	56.0	U. S. Post Hospital.
Menlo Park	R. R.	46.4	47.1	55.8	55.4	61.0	66.5	64.2	63.6	64.6	60.8	53.6	48.3	57.3	Pacific Railway system.
Merced	R. R.	49.0	46.8	62.9	62.1	71.7	78.1	82.5	68.5	74.6	72.0	58.8	49.4	64.7	Do.
Modesto	R. R.	46.6	46.1	59.7	63.8	72.5	78.1	79.3	78.0	74.2	65.8	53.0	44.9	63.5	Do.
Mojave	R. R.	46.5	42.3	62.5	67.4	77.9	78.8	84.9	82.9	77.6	71.5	60.0	50.1	66.9	Do.
Monterey (R. R. station)	R. R.	49.4	48.3	54.0	53.3	58.4	62.0	.....	62.1	62.6	61.4	57.5	53.3	.....	Do.
Napa	R. R.	48.8	45.2	53.5	57.9	62.0	72.7	68.1	65.3	64.3	61.6	51.5	48.6	58.3	Do.
Newhall	R. R.	49.0	46.4	56.7	58.6	63.6	71.1	75.6	72.2	72.4	63.6	55.8	46.5	61.1	Do.
Nicolaus	V. O.	48.3	44.8	59.6	60.7	65.5	72.4	75.0	72.4	70.9	68.6	54.3	48.9	61.8	Alvah Pendleton.
Niles	R. R.	46.6	46.8	57.0	.....	.....	64.5	63.2	60.3	63.6	64.6	62.7	.....	.....	Pacific Railway system.
Oakland	V. O.	49.4	46.1	53.9	54.8	57.7	59.6	57.3	58.5	60.7	61.0	53.4	49.5	55.2	Dr. J. B. Trembley.
Do.	R. R.	51.5	47.7	53.5	56.0	57.5	60.5	58.2	59.0	61.0	61.7	52.9	51.3	55.9	Pacific Railway system.
Orland	R. R.	53.4	45.3	59.4	59.6	69.2	77.8	84.9	81.2	77.4	71.9	61.0	50.5	66.0	Do.
Oroville	V. O.	50.8	47.3	61.1	62.1	70.0	76.9	87.8	76.2	75.2	68.4	58.0	51.0	65.4	Hiram Arents.
Pajaro	R. R.	51.5	48.4	56.1	54.9	58.2	61.9	60.2	58.6	61.4	61.6	53.8	51.0	56.5	Pacific Railway system.
Paso Robles	R. R.	44.3	45.3	54.5	57.9	64.7	70.6	72.5	69.0	69.3	61.7	52.4	46.7	59.1	Do.

Table of monthly and annual mean temperature for 1887—*Voluntary—State weather service—Military posts and Central and Southern Pacific Railroad stations*—Continued.

States and stations.	Character of stations.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Annual.	Authority.
California—Continued.															
Petaluma	R. R.	50.9	49.1	57.5	57.8	65.5	71.7	66.9	65.1	66.0	66.0	54.7	52.5	60.3	Pacific Railway system.
Pleasanton	R. R.	51.6	47.9	57.8	59.5	64.4	69.3	70.4	68.3	68.3	65.1	53.8	51.3	60.6	Do.
Poway	V. O.	50.1	.....	57.4	57.2	.....	67.0	70.0	68.6	68.0	62.6	55.6	.....	.....	Adams Chapin.
Presidio of San Francisco	M. P.	51.2	45.3	52.7	53.7	55.6	58.2	56.5	56.8	60.3	59.6	54.3	50.8	54.6	U. S. Post Hospital.
Red Bluff	R. R.	50.0	43.8	59.7	62.4	72.5	79.6	88.0	83.8	78.4	74.0	57.0	50.3	66.6	Pacific Railway system.
Redding	R. R.	48.6	42.7	59.0	61.6	72.9	76.4	79.8	76.8	71.3	70.5	56.0	45.6	63.4	Do.
Riverside	V. O.	51.4	49.7	60.9	64.1	67.4	71.3	76.2	75.0	73.3	66.5	57.9	50.1	63.6	A. K. Holt.
Rocklin	R. R.	49.6	47.4	56.3	59.6	66.3	72.1	76.6	73.0	72.5	67.1	53.4	46.6	61.7	Pacific Railway system.
Sacramento	R. R.	46.7	44.6	56.7	58.5	64.2	70.7	71.6	68.8	68.0	62.3	51.9	45.2	59.1	Do.
Do	V. O.	44.3	43.7	54.2	57.3	63.0	68.8	69.4	66.2	65.2	58.4	47.8	42.6	56.7	S. H. Gerrish.
Salinas	V. O.	46.8	43.8	52.1	51.8	54.3	58.5	56.9	56.9	58.1	58.5	51.9	46.6	53.0	Dr. E. K. Abbott.
Do	R. R.	47.7	45.2	55.1	54.6	60.5	64.2	60.1	59.3	60.3	61.1	51.3	45.8	55.4	Pacific Railway system.
San Ardo	R. R.	48.0	46.7	56.8	57.7	63.7	67.7	68.2	68.4	67.4	63.1	52.8	46.4	58.9	Do.
San Fernando	R. R.	57.1	54.7	64.9	70.6	74.9	77.1	78.9	80.4	.....	70.0	67.1	54.3	.....	Do.
San Gorgonio	R. R.	48.8	45.2	58.6	57.5	64.2	72.8	77.9	77.2	74.1	66.2	60.7	.....	.....	Do.
San José	R. R.	50.3	48.2	54.8	54.3	58.6	63.9	64.8	63.3	64.7	62.5	54.6	50.5	57.5	Do.
San Mateo	R. R.	50.3	47.0	55.1	57.2	60.6	64.9	63.6	63.6	64.3	64.4	51.2	56.1	57.7	Do.
San Miguel	R. R.	48.0	46.3	57.4	56.8	64.5	69.9	73.7	69.9	68.5	67.0	59.3	49.5	60.9	Do.
Santa Barbara	V. O.	54.7	50.4	57.0	58.4	60.1	63.7	64.6	64.8	66.0	65.0	58.9	52.8	59.7	Hugh D. Vail.
Santa Cruz	R. R.	52.2	49.3	58.2	57.7	59.7	63.9	61.9	62.3	65.1	64.4	55.7	53.0	58.6	Pacific Railway system.
Santa Maria	V. O.	54.0	47.0	58.2	.....	.....	.....	.....	.....	.....	.....	57.5	.....	.....	
Santa Monica	R. R.	50.6	48.7	53.2	55.1	62.1	65.1	66.9	65.8	63.3	67.1	63.9	50.3	60.1	Pacific Railway system.
Selma	R. R.	45.2	47.1	60.0	66.3	73.0	79.4	84.9	81.8	75.7	68.6	57.3	45.1	65.4	Do.
Soledad	R. R.	46.4	45.2	57.3	55.7	59.8	66.0	63.1	61.1	63.3	60.7	50.1	45.4	56.2	Do.
Soquel	R. R.	47.7	49.9	58.5	58.2	58.6	58.8	59.1	58.0	56.1	64.6	58.4	52.1	56.7	Do.
South Side	R. R.	48.6	43.2	57.1	55.6	.....	.....	77.0	75.5	73.9	67.7	59.1	50.7	.....	Do.
South Vallejo	R. R.	53.1	49.4	60.3	62.7	65.3	68.3	67.3	66.5	67.6	65.3	60.3	49.9	61.3	Do.
Spadra	R. R.	54.2	51.6	61.8	59.4	.....	69.5	66.9	77.6	68.3	64.2	58.3	50.8	.....	Do.
Stockton	R. R.	48.5	45.9	58.0	59.5	64.0	68.2	70.3	68.4	68.5	63.9	53.4	46.7	59.6	Do.
Suisun	R. R.	51.7	48.5	59.9	61.0	64.7	68.8	68.2	69.4	71.6	67.6	56.8	48.3	61.4	Do.
Summit	R. R.	28.4	22.3	35.0	35.2	43.7	52.4	59.2	57.4	53.7	49.5	39.7	26.7	41.9	Do.
Sumner	R. R.	26.4	50.1	63.1	65.3	75.7	85.2	91.7	85.8	80.8	68.5	37.3	47.6	64.8	Do.
Tehama	R. R.	49.0	44.8	57.7	56.9	63.6	73.4	77.9	72.5	75.1	67.5	57.5	46.5	61.9	Do.
Tehachapi	R. R.	37.4	33.3	49.7	49.9	56.2	63.9	73.7	71.0	64.4	56.8	46.5	39.0	53.5	Do.
Templeton	R. R.	46.1	47.1	59.1	61.7	67.6	71.2	73.3	69.7	68.9	65.2	55.1	47.8	61.1	Do.
Towles	R. R.	46.5	34.5	52.2	50.6	55.3	62.1	68.1	65.3	64.8	63.3	54.6	46.1	55.3	Do.
Tracy	R. R.	50.9	54.6	62.1	65.0	66.2	75.4	81.3	76.3	73.4	67.6	56.8	49.2	64.9	Do.
Traver	R. R.	46.2	47.0	62.5	64.3	.....	83.0	84.0	79.1	74.1	.....	.....	46.5	.....	Do.

Truckee	R. R.	29.1	24.0	38.2	38.5	50.0	57.5	62.9	60.0	52.1	46.4	37.8	25.1	43.5	Do.
Tulare	R. R.	47.1	48.1	58.8	64.4	69.3	79.1	84.8	80.8	78.6	71.6	58.1	43.3	65.3	Do.
Turlock	R. R.	51.7	52.6	61.7	66.4	73.8	77.5	80.0	73.5	74.4	69.2	55.8	48.1	65.4	Do.
Williams	R. R.	48.6	44.4	59.9	63.9	74.0	78.9	83.1	81.2	75.4	72.7	59.4	51.8	66.1	Do.
Willows	V. O.	48.0	44.0	56.0	57.0	66.1	76.1	80.0	76.9	73.7	68.8	53.0	47.7	62.3	David Bentley.
Do	R. R.	50.0	45.7	60.2	64.7	73.1	80.0	86.3	87.0	78.4	71.7	56.0	46.3	66.6	Pacific Railway system.
Woodland	R. R.	49.2	47.6	60.8	62.0	70.0	81.6	82.8	78.6	77.1	78.1	68.1	51.9	67.3	Do.
Colorado:															
Alma	S. W. S.	13.8	14.6	26.2	30.8	40.7	*51.9	.....	.....	.....	.....	28.1	13.1	.....	W. H. Powless.
Aspen	S. W. S.	.....	.....	.....	41.4	53.1	61.5	63.7	A59.7	55.3	44.4	B36.0	22.5	.....	L. W. Thiele.
Cañon City	S. W. S.	34.8	35.2	47.6	50.7	62.4	71.6	70.5	D68.9	B62.6	.....	.....	.....	.....	F. P. Blake, M. D.
Climax	S. W. S.	.....	.....	.....	.....	.....	M40.4	49.6	51.6	41.4	33.8	21.9	8.4	.....	George C. Wortman.
Collins, Fort	V. O.	26.9	23.7	39.8	45.2	57.7	68.1	69.0	67.7	64.0	48.0	A35.1	.....	.....	Prof. Elwood Meade.
Colorado Springs	S. W. S.	29.9	31.1	43.4	46.7	57.5	67.0	67.5	66.4	61.5	48.1	29.2	.....	.....	Central Office.
Georgetown	S. W. S.	23.2	26.5	36.2	38.2	49.2	59.2	59.4	57.5	53.8	43.0	37.4	24.4	42.3	W. A. Jayne, M. D.
Golden	S. W. S.	.....	.....	.....	.....	59.8	69.5	69.4	69.7	64.6	49.1	45.5	.....	.....	J. M. Shields.
Grand Junction	V. O.	.....	.....	.....	.....	63.1	74.7	76.5	72.0	62.9	49.5	38.2	18.5	.....	Dr. I. F. Ingersoll and F. McClintock.
Husted	S. W. S.	27.2	18.1	39.6	43.6	53.0	63.2	65.4	65.5	59.8	46.0	35.5	.....	.....	E. P. Moon.
Idaho Springs	S. W. S.	26.9	29.2	39.6	42.3	53.3	63.4	62.2	59.8	A54.7	43.4	37.9	26.5	.....	Ignatius Zeller.
Lewis, Fort	M. P.	21.5	25.8	39.4	43.3	53.3	63.3	65.9	62.9	57.2	46.6	36.2	15.9	.....	U. S. Post Hospital.
Longmont	S. W. S.	26.9	29.0	43.4	B48.5	60.1	67.6	B68.6	C61.6	65.5	.....	C32.8	23.5	.....	Edwin J. Clarke, M. D.
Monte Vista	S. W. S.	14.6	22.7	36.6	42.3	.....	60.6	63.9	61.3	56.7	E45.7	A31.1	14.3	.....	C. S. Aldrich.
Pandora	S. W. S.	.....	27.3	41.8	39.0	47.6	55.6	58.8	.....	.....	46.7	35.2	.....	.....	C. Laforgue.
Pueblo	S. W. S.	.....	.....	46.6	52.0	63.4	.....	76.3	70.1	64.5	A51.3	.....	27.1	.....	V. G. Hills and A. S. Dwight.
Red Mountain	S. W. S.	.....	19.0	30.1	31.2	41.9	49.2	52.7	49.5	45.2	36.9	.....	.....	.....	William Gray.
Saguache	S. W. S.	18.9	23.7	38.5	41.5	52.0	62.7	.....	60.5	56.3	45.9	34.9	17.8	.....	J. W. Rambo, M. D.
Trinidad	S. W. S.	30.7	35.1	43.7	46.8	57.3	63.0	67.7	66.0	61.9	51.4	44.1	32.0	50.0	Prof. H. E. Gordon.
T. S. Ranche	S. W. S.	.....	.....	.....	.....	.....	72.8	73.3	68.6	65.6	53.2	42.0	23.9	.....	E. A. Rider.
West Cliffe	S. W. S.	25.1	29.6	38.4	.....	.....	.....	58.4	56.2	51.0	.....	.....	.....	.....	J. E. MacNeill and A. Comstock.
Connecticut:															
Colchester	N. E. M. S.	.....	.....	30.4	44.4	61.2	63.9	73.7	66.6	58.6	49.4	40.5	31.3	.....	S. P. Willard.
Hartford	V. O.	20.1	27.5	28.0	45.1	63.1	66.8	79.2	66.1	.....	49.5	37.5	27.6	.....	W. W. Ellsworth and J. Murtaugh.
Middletown	N. E. M. S.	22.7	28.4	30.3	44.3	61.2	65.6	74.4	66.8	57.8	49.2	38.4	30.0	47.4	H. D. A. Ward.
North Colebrook	V. O.	18.1	.....	22.3	36.8	57.1	61.8	70.9	62.5	52.6	44.2	30.0	24.9	.....	Rev. W. Goodwin.
Shelton	N. E. M. S.	22.3	.....	29.9	43.3	61.6	66.0	76.2	67.0	58.2	48.2	37.8	30.0	.....	C. H. Nettleton and F. B. Wheeler.
Southington	V. O.	22.0	27.8	30.2	44.0	62.7	61.8	76.0	67.4	58.2	48.8	36.5	29.0	47.0	L. Andrews.
Thompson	N. E. M. S.	21.8	24.8	29.7	.....	60.1	64.6	74.5	65.4	56.2	.....	.....	28.3	.....	Miss E. D. Larned.
Voluntown	V. O.	25.7	29.8	31.1	53.0	61.8	66.4	74.8	68.6	58.9	52.6	40.3	31.5	49.5	Rev. E. Dewhurst.
Waterbury	N. E. M. S.	20.4	26.1	28.0	43.0	61.2	65.5	76.9	66.8	57.0	48.0	37.4	29.0	46.6	N. J. Welton.
Dakota:															
Abraham Lincoln, Fort	M. P.	−8.6	−11.2	15.1	41.0	60.9	70.3	71.8	66.0	59.2	41.3	31.2	9.1	37.2	U. S. Post Hospital.
Garden City	V. O.	−1.6	2.4	27.6	44.6	60.9	67.8	70.1	63.7	57.1	41.8	29.4	9.0	39.4	W. C. T. Newell.
Highmore	V. O.	.....	2.8	30.3	47.2	60.6	69.3	C71.2	63.4	58.5	.....	.....	.....	.....	W. K. McDowell.
Meade, Fort	M. P.	17.4	15.7	37.0	45.5	59.8	68.3	71.4	69.0	60.6	43.1	33.6	22.1	45.3	U. S. Post Hospital.
Parkston	V. O.	.....	6.4	30.5	48.8	62.9	70.1	74.3	70.0	63.4	45.3	32.8	14.2	.....	J. J. Swartz.
Pembina, Fort	M. P.	−13.1	−4.2	15.2	35.7	57.0	62.0	66.5	60.3	54.3	36.2	19.9	2.5	34.4	U. S. Post Hospital.
Randall, Fort	M. P.	10.0	23.1	34.2	27.8	65.1	76.0	78.7	68.2	61.3	46.2	34.0	15.3	45.0	Do.
Richardton	V. O.	−2.7	−3.7	24.0	38.8	57.2	50.2	42.4	63.8	55.7	41.2	27.5	8.9	33.6	A. Nordberg.
Sisseton, Fort	M. P.	−5.5	0.9	25.3	43.0	60.0	67.6	69.0	58.4	57.1	38.7	27.6	5.6	37.3	U. S. Post Hospital.
Sully, Fort	M. P.	3.0	2.7	33.6	49.6	65.0	72.8	76.3	69.0	63.4	45.3	33.2	14.1	44.0	Do.
Totten, Fort	M. P.	−9.9	−4.9	20.5	40.2	59.3	63.6	67.7	64.0	56.2	36.5	24.2	4.5	35.2	Do.
Webster	V. O.	−12.6	0.8	28.8	45.3	61.2	69.0	71.7	64.3	57.9	39.6	30.7	10.7	38.9	A. Betts.

Table of monthly and annual mean temperature for 1887—*Voluntary—State weather service—Military posts and Central and Southern Pacific Railroad stations*—Continued.

States and stations.	Character of stations.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Annual.	Authority.
Dakota—Continued.															
Yates, Fort	M. P.	2.4	—1.4	26.8	44.1	62.3	72.0	74.0	69.5	61.4	43.4	31.0	11.4	41.4	U. S. Post Hospital.
District of Columbia:															
Kendall Green	V. O.	.....	33.6	38.2	53.7	70.0	.....	.....	.....	.....	57.7	45.8	36.2	.....	Deaf and Dumb Institution.
Rock Creek Bridge	V. O.	35.9	42.8	42.2	55.7	73.6	76.4	85.7	78.5	69.5	59.3	47.2	40.0	58.9	Washington Water-Works.
Washington Reservoir (res.)	V. O.	32.2	39.4	38.2	52.7	71.0	74.5	83.3	76.1	66.8	56.2	44.4	37.5	56.0	Do.
Washington Reservoir (dis.)	V. O.	32.7	40.1	39.4	53.6	71.6	75.1	83.5	75.6	66.6	56.9	45.2	38.1	56.5	Do.
Florida:															
Archer	V. O.	48.9	58.9	55.3	62.2	68.2	71.2	75.4	79.8	79.0	71.6	61.7	59.3	66.0	J. C. Neal, M. D.
Duke	V. O.	51.4	61.4	58.3	66.1	71.0	76.4	79.7	78.9	77.1	72.2	61.4	60.3	67.8	B. P. Ferrill.
Homeland	V. O.	59.9	71.6	65.7	73.3	76.4	80.1	82.4	82.6	80.1	76.7	64.9	64.9	73.2	J. S. Wade.
Limona	V. O.	57.5	71.6	64.2	78.4	76.3	79.2	83.3	83.0	78.6	76.2	66.7	63.9	73.2	J. G. Knapp.
Manatee	V. O.	58.1	72.2	65.2	73.8	77.5	82.8	84.2	83.8	81.2	77.2	66.4	64.3	73.9	Mary W. Broberg.
Meade, Fort	V. O.	54.0	65.0	59.0	65.0	78.0	82.0	86.0	86.0	79.0	66.0	55.0	59.0	69.5	A. H. Adams.
Merritt's Island	V. O.	58.6	69.4	64.1	70.4	75.3	81.0	80.8	81.0	78.7	75.8	67.4	63.9	72.2	Rev. J. H. White.
Nama	V. O.	57.9	67.1	61.0	68.0	71.6	76.4	79.0	79.1	76.1	73.7	62.8	61.6	69.5	C. E. Robins.
Saint Augustine, Fort	M. P.	52.3	62.9	59.1	67.6	69.4	78.9	81.8	78.4	77.8	73.7	61.6	57.5	68.4	U. S. Post Hospital.
Tallahassee	V. O.	41.0	63.0	60.0	66.8	.....	80.2	79.9	.....	77.5	68.3	60.0	54.1	.....	Rev. W. H. Carter.
Georgia:															
Athens	V. O.	37.8	51.1	49.4	60.2	71.2	75.0	78.2	74.5	71.3	58.1	49.5	41.2	59.8	Prof. L. H. Charbonnier.
Forsyth	V. O.	43.5	57.5	57.1	66.6	74.9	79.7	81.4	80.3	76.5	65.1	56.9	48.1	65.6	T. G. Scott.
Milledgeville	V. O.	41.0	56.3	54.0	64.0	74.3	79.0	81.4	78.9	73.3	62.0	52.2	45.9	63.5	S. A. Cook.
Quitman	V. O.	47.1	64.2	58.8	66.8	.....	.....	.....	.....	76.8	67.5	58.0	52.4	.....	J. L. Cutler.
Idaho:															
Boisé Barracks	M. P.	36.0	31.9	48.1	50.3	64.4	65.0	77.3	75.3	64.2	51.9	40.0	32.7	53.1	U. S. Post Hospital.
Sherman, Fort	M. P.	32.5	16.5	39.3	44.5	54.3	59.5	66.9	65.6	55.2	46.2	37.0	32.2	45.8	Do.
Illinois:															
Albion	S. W. S.	.....	38.5	42.0	54.6	69.7	74.5	.....	.....	.....	52.7	41.4	32.8	.....	B. T. Michels.
Atwood	S. W. S.	20.2	29.4	.....	52.0	.....	71.8	.....	75.2	.....	50.0	.....	.....	.....	J. W. C. Gray.
Aurora	S. W. S.	11.2	25.4	32.3	48.6	64.8	72.0	78.1	.....	63.5	46.2	35.4	24.6	.....	Dr. M. M. Robbins.
Beason	S. W. S.	.....	.....	.....	.....	71.0	76.6	84.5	77.5	69.0	51.8	40.8	29.6	.....	L. H. Sullivan.
Belvidere	S. W. S.	10.9	23.6	32.1	50.4	64.7	71.9	76.7	71.5	60.5	46.3	34.6	23.8	47.2	E. L. Lawrence.
Cedarville	S. W. S.	.....	21.4	29.1	48.5	65.4	71.9	76.1	72.5	60.8	44.1	33.4	21.5	.....	J. Wright.
Centralia	S. W. S.	24.9	35.0	41.8	56.1	70.0	.....	88.0	.....	.....	.....	.....	31.0	.....	J. L. Hallam.
Charleston	V. O.	23.0	34.9	38.5	53.4	68.4	75.8	80.6	76.2	67.5	49.3	39.1	29.9	53.0	J. B. Dazey.
Collinsville	V. O.	23.9	36.6	44.6	55.9	67.7	70.1	80.2	74.7	77.5	51.8	37.3	29.8	54.2	J. R. Wadsworth.
Fairfield	S. W. S.	.....	.....	44.3	57.2	69.0	77.3	.....	.....	.....	56.0	46.4	35.2	.....	J. Hall.
Flora	S. W. S.	23.5	35.0	38.0	51.0	66.0	69.8	79.0	76.0	67.9	51.0	41.0	32.0	52.5	L. A. Michels.
Geneseo	V. O.	12.0	24.2	32.9	52.3	63.7	74.2	79.7	75.6	59.5	.....	.....	23.2	.....	Prof. N. W. Thornton.
Golconda	S. W. S.	31.9	43.4	47.0	59.7	71.9	76.0	82.6	79.8	72.3	55.4	.....	35.7	.....	J. E. Y. Hanna.

Greenville	S. W. S.	.....	.....	.....	.....	.....	73.8	80.2	76.2	68.0	50.8	40.8	29.6	.....	M. S. Owdyn.
Griggsville	S. W. S.	20.1	30.4	36.2	52.3	66.2	72.2	77.8	76.0	64.6	48.7	38.8	23.3	50.6	L. Eastman.
Hoopeston	S. W. S.	.....	28.8	34.5	51.1	68.1	74.5	80.1	72.9	64.3	45.5	38.0	27.2	.....	Miss C. J. Trego.
Irishtown	S. W. S.	24.9	37.9	43.1	56.6	70.0	75.9	82.3	78.8	69.2	52.0	41.9	33.0	55.5	W. Rogan.
Jacksonville	V. O.	19.9	31.5	38.6	54.3	67.7	.....	.....	.....	.....	50.2	40.1	28.3	.....	P. J. Hasenstab.
Joliet	S. W. S.	14.3	27.2	33.4	50.4	64.3	72.6	76.9	72.8	60.5	45.0	38.7	27.2	48.6	Miss A. B. Nash.
Jordan's Grove	S. W. S.	.....	37.5	43.8	57.6	71.0	77.8	82.1	78.1	71.4	53.6	41.1	32.0	.....	W. J. S. Cathcart.
Kankakee	S. W. S.	18.0	29.0	34.0	50.6	66.3	73.1	80.4	72.6	.....	48.2	.....	.....	.....	W. M. Wells.
Lacon	S. W. S.	.....	.....	.....	.....	68.2	70.0	82.2	75.9	68.0	49.2	38.2	27.4	.....	Rev. A. C. Price.
Lake Forest	S. W. S.	14.8	25.5	23.6	44.2	60.4	67.6	74.9	70.5	61.3	46.1	35.0	26.8	45.9	L. R. F. Griffin.
Lanark	S. W. S.	.....	.....	.....	.....	68.4	75.0	80.7	74.3	64.0	47.0	35.7	23.0	.....	G. L. Beeler.
Martinsville	S. W. S.	.....	35.4	40.0	52.8	73.7	76.3	82.0	78.4	64.3	49.3	47.8	29.5	.....	J. B. Sheapley.
Mattoon	V. O.	24.0	38.0	41.0	53.0	66.0	73.0	81.5	74.0	67.3	48.0	39.0	30.0	52.9	W. Dozier.
McLeansborough	V. O.	28.5	40.4	43.6	55.2	69.9	73.5	80.4	77.8	69.9	52.4	42.5	34.0	55.7	W. P. Gibbs.
Melvin	S. W. S.	16.2	29.2	34.0	50.7	65.0	70.9	77.5	74.0	64.0	48.2	.....	.....	.....	F. Dienelt.
Minonk	S. W. S.	16.0	28.8	34.2	53.4	70.0	75.5	83.0	d75.9	.....	.....	.....	.....	.....	
Monmouth	S. W. S.	11.0	27.0	.....	.....	.....	.....	80.4	.....	65.8	.....	35.6	23.0	.....	Prof. J. C. Hutchison.
Mount Morris	S. W. S.	.....	.....	.....	.....	68.0	.....	82.0	71.0	65.3	.....	37.3	24.4	.....	W. Feary.
Oneida	S. W. S.	14.0	27.6	35.9	53.9	68.6	75.5	80.1	72.3	.....	48.9	37.0	24.8	.....	J. A. Wetmore.
Oswego	V. O.	13.8	23.8	30.6	47.8	61.8	69.5	75.4	67.0	61.4	44.3	34.3	24.6	46.2	J. S. Seely.
Ottawa	S. W. S.	15.2	26.9	32.6	50.5	65.4	71.1	79.0	70.0	62.6	46.1	34.7	25.2	48.3	Dr. J. O. Harris.
Pana	S. W. S.	20.0	32.7	34.2	...	65.7	70.0	75.6	.....	67.2	40.4	37.7	25.7	.....	J. K. Eberle.
Palestine	V. O.	25.6	38.7	40.7	54.3	71.8	75.7	83.6	77.5	70.9	54.0	44.2	31.9	55.7	J. E. Templeton.
Paris	S. W. S.	20.8	32.1	35.2	49.6	64.7	73.8	79.6	75.8	64.4	48.0	33.9	28.8	50.6	W. T. Cook.
Payson	S. W. S.	19.8	31.7	39.7	55.3	.....	74.1	80.1	76.0	.....	.....	41.8	.....	.....	D. E. Robbins.
Pekin	V. O.	17.0	30.8	40.8	56.4	69.6	76.2	82.0	73.0	67.9	50.0	39.6	29.0	52.7	Rev. J. E. Terborg.
Peoria	V. O.	21.0	32.7	38.9	57.3	71.1	77.7	83.2	76.7	68.6	50.4	41.1	29.9	54.0	Dr. F. Brendel.
Philo	S. W. S.	18.3	29.3	36.0	52.7	70.0	73.0	83.0	74.0	66.0	48.0	.....	.....	.....	H. A. Burr.
Pontiac	S. W. S.	.....	27.5	33.6	51.1	64.9	72.3	81.0	73.8	65.2	46.3	36.2	26.5	.....	I. Young.
Prairieville	S. W. S.	14.2	23.2	32.2	51.8	...	73.2	77.4	.....	64.7	41.9	34.2	24.2	.....	M. Schick.
Riley	V. O.	11.1	21.6	28.3	47.0	62.9	69.0	75.1	68.1	59.3	43.2	32.6	22.2	45.0	J. W. James.
Richview	S. W. S.	26.3	36.9	42.5	54.9	68.1	73.4	81.1	76.6	69.8	53.7	42.7	31.9	54.8	A. G. Tucker.
Rockford	V. O.	12.7	22.4	29.6	49.5	64.3	72.2	75.6	69.7	60.5	44.2	33.9	23.6	46.5	T. D. Robertson.
Sandwich	V. O.	15.2	27.2	34.4	53.1	68.6	75.1	79.8	73.3	65.6	48.8	37.2	27.4	50.5	N. E. Ballou.
Sumner	S. W. S.	.....	37.8	41.0	53.7	70.9	72.7	82.5	78.4	.....	50.2	56.0	32.5	.....	J. A. Fyffe.
Sycamore	V. O.	12.5	23.4	30.4	48.2	63.5	69.5	75.0	68.8	60.8	43.8	33.3	24.0	46.1	R. Dow.
Three Mile	S. W. S.	27.1	37.9	44.5	.....	68.6	.....	76.1	.....	66.8	48.9	.....	33.2	.....	W. B. Anderson.
Toulon	S. W. S.	14.2	24.2	20.3	53.0	.....	65.9	75.1	74.2	.....	.....	35.5	24.9	.....	E. Butler.
Vandalia	S. W. S.	23.2	.....	42.5	.....	70.8	74.2	82.5	77.5	68.7	51.6	42.3	31.5	.....	J. Urbani.
Watseka	S. W. S.	19.3	29.6	34.7	50.6	61.5	71.0	77.3	70.3	63.3	46.6	38.0	27.2	49.1	H. Upsall.
White Hall	S. W. S.	21.2	34.1	42.1	.....	70.8	76.1	.....	79.2	70.2	.....	42.7	30.2	.....	P. J. Bates.
Windsor	V. O.	21.8	30.3	38.9	52.4	69.9	75.1	80.8	74.5	68.1	50.5	40.0	28.2	52.5	A. H. Hatch.
Woodstock	S. W. S.	11.8	22.3	28.8	47.7	.....	70.0	76.0	66.1	58.0	.....	.....	21.7	.....	G. D. Silliman.
Indiana:															
Angola	S. W. S.	19.0	27.2	30.8	45.2	70.8	71.2	77.9	69.8	65.5	45.1	36.6	27.4	48.9	L. Stealy.
Blue Lick	S. W. S.	.....	39.7	42.5	54.5	69.1	73.7	81.4	77.2	69.4	52.3	.....	.....	.....	G. Poindexter.
Brookville	S. W. S.	25.6	36.5	38.6	.....	65.5	73.8	80.4	77.5	66.7	49.5	38.7	34.0	.....	A. W. Butler.
Butlerville	V. O.	24.0	38.6	42.5	55.1	73.4	75.2	83.6	77.0	69.0	52.3	41.6	32.3	55.4	C. F. Hole.
Columbia City	S. W. S.	20.3	29.3	33.5	48.9	66.4	71.8	78.9	70.5	62.8	.....	37.6	26.9	.....	Dr. N. I. Kithcart.
Columbus	S. W. S.	25.2	34.8	37.2	50.5	66.1	72.8	81.3	72.9	64.7	48.9	37.2	31.9	52.0	J. A. Perry.
Connersville	S. W. S.	25.0	35.4	38.3	48.1	67.0	73.9	79.5	73.4	66.5	48.7	39.0	29.9	52.1	R. Hessler.

Table of monthly and annual mean temperature for 1887—*Voluntary—State weather service—Military posts and Central and Southern Pacific Railroad stations*—Continued.

States and stations.	Character of stations.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Annual.	Authority.
Indiana—Continued.															
Degonia	S. W. S.	30.9	42.4	44.7	55.7	69.0	72.8	80.9	76.8	66.2	53.0	42.3	34.7	55.8	James P. White.
Delphi	S. W. S.	19.9	32.1	.....	51.1	66.5	75.1	80.5	71.7	65.9	48.2	37.3	29.0	.....	Higginbotham & Son.
Farmland	S. W. S.	23.4	33.6	37.3	49.8	66.0	.....	78.0	70.6	64.3	47.5	34.9	30.8	.....	W. J. Davisson.
Fort Wayne	V. O.	24.0	33.2	36.9	51.2	.....	.....	.....	.....	.....	.....	37.8	28.1	.....	F. W. Kulme, W. F. Socum.
Franklin	S. W. S.	24.3	35.5	38.5	50.8	65.6	72.3	79.2	69.1	67.4	49.4	38.8	30.3	51.8	D. A. Owen.
Jeffersonville	V. O.	31.6	40.4	43.8	55.3	70.2	75.4	82.3	77.0	67.8	54.2	43.4	35.2	56.4	John C. Loomis.
Laconia	V. O.	29.0	41.1	43.4	51.8	69.7	75.0	83.0	76.7	69.3	50.4	41.8	33.9	55.4	Lafe Crozier.
La Fayette	V. O.	20.1	31.5	37.6	50.6	65.5	72.3	79.8	72.2	64.8	48.5	37.3	28.8	50.8	Purdue University.
Logansport	V. O.	22.4	32.9	37.2	53.1	69.0	75.1	81.8	73.3	66.7	50.5	39.4	31.0	52.7	Thomas B. Helm.
Marengo	S. W. S.	23.5	42.5	44.7	55.6	68.6	72.7	81.1	77.3	69.3	54.4	44.3	36.1	55.8	J. M. Johnson.
Marion	S. W. S.	18.6	31.4	33.3	.....	63.6	72.2	79.6	.....	.....	.....	.....	.....	.....	S. R. Fankboner.
Mauzy	V. O.	21.2	32.6	35.3	47.6	65.6	69.8	77.1	69.8	58.2	43.0	34.4	26.9	48.5	E. Kirkwood.
Mount Vernon	S. W. S.	.....	36.6	37.2	58.1	72.4	78.5	83.6	80.1	71.6	55.9	45.3	35.3	.....	J. M. Lockwood.
Muncie	S. W. S.	23.8	32.6	37.5	50.6	65.5	69.4	77.9	69.2	63.4	49.1	37.4	27.4	50.3	T. E. Huston, A. S. Michner.
Princeton	S. W. S.	28.3	39.5	42.2	53.2	68.0	74.3	82.2	81.2	71.1	55.7	40.8	34.5	55.9	Elisha Jones.
Richmond	S. W. S.	24.3	35.6	37.3	50.2	68.5	72.7	83.3	71.1	64.7	47.9	38.3	29.9	52.0	J. M. Gluys.
Rockville	S. W. S.	.....	.....	.....	.....	63.5	74.2	82.5	74.3	67.2	51.1	42.5	28.0	.....	A. C. Bates.
Salem	S. W. S.	27.7	39.7	40.8	52.4	68.0	71.8	81.4	74.1	67.4	51.6	44.2	32.7	54.3	James W. May.
Spiceland	S. W. S.	.....	.....	.....	53.3	66.1	73.1	80.0	71.9	64.5	48.4	38.5	30.4	.....	William Dawson.
Sunman	V. O.	26.1	35.3	39.2	51.8	69.8	74.4	81.9	74.9	66.6	51.3	40.4	30.4	53.5	B. F. Ferris.
Vevay	V. O.	30.4	41.3	42.9	53.9	68.6	73.4	81.1	76.2	68.5	52.6	42.7	35.5	55.6	Prof. Charles G. Boerner.
Worthington	S. W. S.	25.7	37.7	40.8	54.1	68.2	74.4	79.9	74.1	68.3	51.6	49.3	31.2	54.6	Dr. W. B. Squire.
Indian Territory:															
Gibson, Fort	M. P.	34.9	43.2	53.6	63.8	70.9	76.5	83.4	80.2	72.7	57.6	48.0	.....	.....	U. S. Post Hospital.
Reno, Fort	M. P.	34.8	39.8	52.8	62.6	70.0	76.7	84.9	80.4	70.1	57.1	47.2	34.1	59.2	Do.
Supply, Fort	M. P.	30.4	.....	.....	57.7	69.2	75.5	82.4	76.4	.....	55.9	43.0	.....	.....	Do.
Iowa:															
Albia	V. O.	14.6	26.0	39.4	56.3	59.7	74.5	81.1	75.7	66.3	50.3	38.0	24.3	50.5	Alph Koonts.
Bancroft	V. O.	2.0	11.6	29.0	46.3	63.6	70.1	73.7	67.6	59.8	42.8	37.4	11.6	43.0	H. N. Renfrew.
Cedar Rapids	V. O.	13.5	16.0	31.8	49.5	66.3	74.1	77.8	72.4	63.2	46.5	34.2	22.7	47.3	H. D. Olds.
Do	V. O.	8.8	19.0	32.8	49.8	64.5	.....	.....	.....	62.0	44.5	33.0	.....	.....	Prof. Frederick Starr.
Clinton	V. O.	12.3	28.1	32.4	50.9	66.6	72.6	76.5	70.1	62.2	44.5	34.3	22.7	47.4	Luke Roberts.
Cresco	V. O.	3.0	13.1	28.0	46.3	59.0	70.8	77.1	69.0	58.0	41.9	29.4	18.0	42.8	Gregory Marshall.
Des Moines	V. O.	9.8	18.8	36.0	51.9	65.9	71.3	76.6	71.5	64.3	*46.3	37.3	23.4	47.8	Adolphus Voegeli.
Elkader	V. O.	5.1	15.4	29.1	49.4	69.0	74.1	77.0	69.1	60.2	41.4	28.5	19.5	44.8	Mrs. J. N. Hamilton.
Madison, Fort	V. O.	15.4	26.8	37.4	55.2	68.2	75.8	82.1	75.2	66.1	48.4	42.5	25.4	51.5	Miss L. A. McCready.
Humboldt	V. O.	5.2	.....	.....	.....	.....	73.2	77.9	66.9	60.1	44.0	32.3	16.6	.....	Florence Prouty.
Independence	V. O.	7.9	18.1	31.1	48.7	67.0	71.7	76.0	69.4	60.5	44.7	32.7	21.0	45.7	E. F. Wülfke.
Logan	V. O.	10.9	18.6	39.4	55.3	66.7	74.4	77.3	73.5	66.4	50.0	37.5	23.0	49.4	J. T. Stern.

Monticello	V. O.	8.9	19.5	32.0	49.6	65.1	72.0	76.2	69.8	61.0	43.8	32.5	21.4	46.0	H. D. Smith.
Mount Pleasant	V. O.	11.0	23.6	33.7	51.4	65.0	71.7	77.6	71.4	62.8	45.8	34.9	22.4	47.6	H. N. Bassett.
Mount Vernon	V. O.	9.0	21.6	34.0	53.0	69.4	76.2	.....	74.3	64.9	47.7	35.8	22.0	.....	Prof. Alonzo Collin.
Muscatine	V. O.	12.5	23.4	34.4	50.8	65.0	71.8	78.4	71.8	50.4	47.7	36.4	24.2	47.2	J. P. Walter.
Nashua	V. O.	4.5	12.6	28.0	40.7	*59.6	.....	.....	.....	.....	39.8	31.2	21.4	.....	H. W. Knight.
Oskaloosa	V. O.	10.3	20.2	33.1	51.6	68.2	74.7	81.6	74.3	65.7	43.1	41.1	24.1	49.0	O. H. Avey.
Do	V. O.	8.2	20.6	38.1	51.1	67.0	73.1	80.0	74.1	65.1	47.3	32.5	21.3	56.5	Joseph Boyd.
Kansas:															
Allison	V. O.	26.2	25.0	39.6	52.0	66.7	73.8	78.0	.....	.....	.....	.....	.....	.....	John J. Cass.
Brookville	S. W. S.	.....	31.6	46.5	59.9	.....	79.2	.....	.....	70.0	54.0	44.0	31.0	.....	F. Coulton.
Buffalo Park	S. W. S.	.....	31.4	49.6	58.1	.....	85.0	.....	.....	68.0	52.0	42.0	.....	.....	E. C. Moore, E. M. Smith.
Bunker Hill	S. W. S.	.....	30.7	51.1	62.5	.....	80.3	.....	.....	74.0	57.0	47.0	.....	.....	F. D. Sperry.
Carneiro	S. W. S.	.....	28.2	43.4	55.8	.....	75.5	.....	.....	67.0	51.0	40.0	.....	.....	W. H. Boyle.
Collyer	S. W. S.	.....	28.8	45.2	49.4	.....	77.3	.....	.....	67.0	50.0	40.0	.....	.....	E. M. Crozier, R. W. Hobert
Dorrance	S. W. S.	.....	28.8	44.7	55.7	.....	83.6	.....	.....	77.0	60.0	45.0	29.0	.....	W. H. Sweet.
El Dorado	V. O.	26.7	32.4	45.5	55.5	68.8	74.6	80.1	76.8	69.7	.....	42.7	.....	.....	H. C. Ford.
Ellis	S. W. S.	.....	28.2	39.6	52.6	.....	77.8	.....	.....	68.0	50.0	37.0	.....	.....	F. E. Call.
Ellsworth	S. W. S.	.....	28.8	44.8	60.8	.....	80.8	.....	.....	71.0	59.0	43.0	32.0	.....	R. L. Logan, A. D. Maggart.
Emporia	V. O.	24.8	31.0	44.4	57.7	69.8	75.0	79.9	77.8	67.1	54.4	43.9	.....	.....	H. E. Sadler.
Eustis	S. W. S.	.....	23.4	41.6	50.7	62.6	72.4	75.5	68.0	65.0	48.0	34.0	22.0	.....	Charles E. Bennett.
Globe	V. O.	22.6	29.4	42.8	56.3	69.0	75.3	78.2	75.5	68.4	52.5	41.4	27.8	53.2	William Featherston.
Gorham	S. W. S.	.....	31.7	45.7	55.9	.....	80.0	.....	.....	77.0	52.0	44.0	24.0	.....	R. G. Palmer.
Grainfield	S. W. S.	.....	28.9	50.7	58.4	.....	75.6	.....	.....	70.0	60.0	48.0	28.0	.....	E. A. Lewis.
Grenola	S. W. S.	.....	.....	.....	.....	*73.1	79.2	81.9	78.0	.....	.....	.....	29.0	.....	R. M. Lawyer.
Grinnell	S. W. S.	.....	27.0	46.7	60.1	.....	83.8	.....	.....	70.0	63.0	.....	.....	.....	F. H. Woomer.
Hays City	S. W. S.	.....	27.7	45.8	58.9	.....	78.8	.....	.....	71.0	58.0	43.0	.....	.....	F. E. Black, Thomas Gallegher.
Hays, Fort	M. P.	23.0	25.7	43.2	53.7	64.4	71.7	79.1	74.5	67.8	52.2	35.6	26.4	51.4	U. S. Post Hospital.
Independence	V. O.	27.1	35.2	48.4	59.8	68.8	76.5	81.0	77.6	69.8	54.8	44.9	30.3	56.2	J. M. Altaffer.
Kanopolis	S. W. S.	.....	31.2	43.5	52.9	.....	76.9	.....	.....	71.0	57.0	44.0	.....	.....	E. M. Crozier, J. L. Morton.
Lawrence	V. O.	.....	30.4	43.3	57.7	67.9	73.9	79.8	73.6	67.6	52.0	.....	.....	.....	Prof. F. H. Snow.
Lebo (Marydale Farm)	V. O.	.....	31.3	41.3	56.6	69.2	75.8	79.8	.....	68.3	53.2	42.0	.....	.....	C. W. Burnett.
Manhattan	V. O.	19.6	27.0	40.7	57.0	68.5	74.8	79.8	.....	67.8	51.1	43.1	25.8	.....	C. P. Blachly.
Do	V. O.	22.2	28.0	42.4	58.2	69.1	74.3	81.2	74.0	.....	.....	.....	.....	.....	Agricultural College.
Monument	S. W. S.	.....	26.7	42.5	51.1	.....	80.6	.....	.....	68.0	46.0	38.0	24.0	.....	J. W. Edwards.
Morse	V. O.	.....	.....	.....	.....	.....	.....	79.0	76.0	68.0	30.0	43.0	35.0	.....	R. P. Edginton.
Ninnescah	V. O.	26.0	31.1	46.1	58.8	69.6	77.0	81.3	76.1	70.1	53.0	39.9	26.3	54.6	E. Shaw.
Oakley	S. W. S.	.....	27.9	46.6	59.3	.....	77.1	.....	.....	72.0	62.0	47.0	28.0	.....	C. M. Kaufman.
Ogallah	V. O.	.....	30.0	49.4	59.8	.....	82.3	.....	.....	72.0	59.0	45.0	.....	.....	Blanche Marshall.
Riley, Fort	M. P.	21.7	28.0	43.1	59.0	71.3	77.4	82.3	75.7	69.3	54.0	43.5	27.4	54.4	U. S. Post Hospital.
Rome	S. W. S.	.....	33.9	47.6	59.4	68.7	75.8	82.1	77.0	70.0	57.0	43.0	30.0	.....	D. M. Adams.
Russell	S. W. S.	.....	25.1	46.1	.....	.....	79.2	.....	.....	60.0	54.0	40.0	28.0	.....	A. E. Floyd, W. J. Hillyer.
Salina	V. O.	26.0	30.2	43.5	58.1	71.3	76.9	82.6	84.1	71.2	56.3	44.5	28.2	56.1	John H. Gibson.
Sedan	S. W. S.	.....	37.9	50.1	59.7	70.0	75.6	82.2	79.0	72.0	59.0	49.0	34.0	.....	John W. Goodell.
Sheridan	S. W. S.	.....	24.4	42.9	54.2	.....	77.5	.....	.....	67.0	51.0	38.0	.....	.....	H. G. Adams, W. H. Parker.
Topeka	S. W. S.	.....	28.1	.....	57.2	68.6	73.0	78.5	73.0	67.0	52.0	42.0	28.0	.....	Central Station.
Victoria	S. W. S.	.....	32.2	51.9	61.3	.....	78.6	.....	.....	75.0	63.0	48.0	33.0	.....	W. J. Holt.
Wa Keeney	S. W. S.	.....	28.7	50.4	62.7	.....	75.4	.....	.....	68.0	58.0	45.0	.....	.....	C. C. Hay.
Wakefield	V. O.	23.7	29.3	44.0	58.9	70.5	76.2	81.3	75.4	69.6	54.0	42.2	28.5	54.5	William P. Cochrane.
Wellington	V. O.	26.7	35.0	48.8	58.1	69.1	76.3	81.3	77.3	73.2	56.4	43.8	31.8	56.5	John H. Wolfe.
Wilson	V. O.	.....	31.9	48.2	54.7	67.4	75.0	80.6	75.0	67.7	51.6	40.2	26.5	.....	E. Dollinmayer.
Winona	V. O.	28.9	46.7	52.7	.....	.....	75.7	.....	.....	66.0	55.0	41.0	29.0	.....	J. S. Adams.
Yates Centre	V. O.	23.5	32.1	44.2	56.7	67.6	72.0	79.0	73.6	64.4	52.4	39.7	28.2	52.8	F. R. Gray.

Table of monthly and annual mean temperature for 1887—*Voluntary—State weather service—Military posts and Central and Southern Pacific Railroad stations*—Continued.

States and stations.	Character of stations.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Annual.	Authority.
Kentucky:															
Bowling Green	V. O.	37.5	.....	45.7	51.9	77.6	78.9	82.4	77.7	68.8	56.0	47.7	38.5	.....	M. H. Crump.
Frankfort	V. O.	.....	.....	43.8	53.1	69.6	73.4	80.6	76.5	69.3	.....	42.9	.....	.....	E. C. Went.
Harper's Ferry	V. O.	30.4	42.8	46.6	52.7	70.9	76.4	85.9	78.7	.....	.....	.....	.....	.....	E. G. Harper.
Midway	V. O.	31.5	33.8	43.0	54.9	69.0	73.9	.....	.....	.....	.....	.....	.....	.....	Dr. M. E. Poynter.
Louisiana:															
Grand Coteau	V. O.	50.3	64.6	64.9	69.1	74.4	80.0	81.5	80.9	77.1	66.1	59.6	51.8	68.4	Rev. C. M. Widman.
Liberty Hill	V. O.	49.5	59.0	66.5	71.5	76.5	84.5	85.5	89.8	81.0	.....	.....	49.0	.....	E. A. Crawford, M. D.
Maine:															
Bar Harbor	V. O.	29.0	22.4	29.0	39.0	53.6	60.0	66.0	65.0	57.0	40.1	39.0	26.5	43.9	Joseph Wood.
Belfast	N. E. M. S.	17.5	20.3	28.1	39.1	55.3	60.2	67.6	62.7	55.5	46.4	36.6	25.4	42.9	L. H. Murch.
Cornish	V. O.	16.3	19.1	26.2	38.9	58.6	64.6	72.7	64.0	55.2	45.1	34.2	24.2	43.3	Silas West.
Fairfield	N. E. M. S.	11.0	.....	22.6	.....	58.6	65.0	72.5	64.7	56.9	46.2	33.7	24.0	.....	H. M. Mansfield.
Gardiner	V. O.	15.8	19.8	27.5	37.2	55.7	62.0	70.4	63.2	55.0	46.2	35.1	25.5	42.8	Rev. Charles L. Wells.
Kent's Hill	V. O.	12.8	16.0	25.2	37.8	56.1	62.3	.....	.....	54.2	45.0	33.1	22.0	.....	W. C. Strong.
Lewiston	N. E. M. S.	14.4	17.5	26.0	37.2	56.8	63.9	72.7	64.9	56.1	45.6	34.1	24.1	42.8	Union Water Power Company.
Mayfield	N. E. M. S.	.....	.....	.....	34.7	56.4	63.5	68.1	61.2	52.0	40.7	28.5	.....	.....	V. P. Hall.
Orono	V. O.	14.0	17.8	25.9	37.4	55.9	62.8	71.0	63.4	54.5	44.7	33.9	23.7	42.1	Prof. M. C. Fernald.
Petit Manan	N. E. M. S.	.....	21.6	.....	37.4	47.6	53.9	61.6	58.7	.....	46.8	38.5	.....	.....	G. L. Upton.
Maryland:															
Cumberland	V. O.	28.6	36.9	34.9	49.2	65.9	69.6	77.7	70.2	61.9	50.0	39.8	32.9	51.4	E. T. Shriver.
Fallston	V. O.	28.6	35.6	34.6	47.5	64.6	68.6	76.7	70.0	61.6	52.9	41.6	33.4	51.3	Prof. G. G. Curtiss.
Great Falls	V. O.	31.9	39.9	37.9	51.3	70.6	74.4	82.4	75.0	65.7	54.9	43.4	36.3	55.2	Washington Water-Works.
McDonogh	V. O.	30.2	36.7	35.3	54.2	66.2	70.4	80.1	71.4	63.1	55.3	42.8	34.2	53.3	McDonough Institute.
McHenry, Fort	M. P.	31.1	38.2	37.7	52.8	70.8	72.2	81.3	73.9	63.4	64.2	43.6	36.5	55.5	U. S. Post Hospital.
New Midway	V. O.	32.0	38.0	37.0	51.3	70.9	73.4	82.4	71.9	62.3	51.5	42.2	35.1	54.0	G. F. Smith.
Woodstock	V. O.	30.0	37.0	36.0	49.0	65.0	70.0	78.0	70.0	62.2	52.5	41.0	34.0	52.1	Woodstock College.
Massachusetts:															
Amherst	V. O.	19.4	24.2	26.4	41.6	60.9	65.7	73.7	64.9	55.9	47.0	36.5	26.6	45.2	Massachusetts Experimental Station.
Do	V. O.	21.9	.....	30.1	43.3	62.6	66.3	72.3	65.9	57.0	48.1	40.0	29.7	.....	Miss S. C. Snell.
Blue Hill (base)	V. O.	22.8	28.2	30.2	43.6	59.5	64.6	73.4	66.0	58.0	50.3	38.3	32.0	47.2	A. L. Rotch.
Blue Hill (summit)	V. O.	21.3	25.6	27.7	41.4	57.7	62.7	70.8	64.1	56.5	47.8	38.2	28.9	45.2	Do.
Cambridge	V. O.	22.8	26.8	30.1	43.3	60.0	65.3	74.6	66.7	59.8	50.0	40.4	31.0	47.6	Harvard College Observatory.
Do	N. E. M. S.	22.4	26.6	30.0	43.2	60.0	65.8	75.8	67.2	58.5	.....	38.8	30.6	.....	E. C. Brooks.
Chestnut Hill	N. E. M. S.	23.1	27.6	30.2	43.0	59.4	65.1	74.7	66.5	58.4	49.5	40.6	30.6	47.4	Boston Water-Works.
Concord	N. E. M. S.	21.8	26.9	30.8	44.0	61.4	66.8	77.1	67.0	57.0	48.8	38.8	29.8	47.5	J. O. Haskell.
Cotuit	N. E. M. S.	26.8	29.5	30.8	41.8	56.7	62.2	72.5	67.3	59.3	51.2	41.6	32.8	47.7	J. H. Reed.
Dalton	N. E. M. S.	19.9	24.9	26.4	40.3	63.0	65.2	73.4	67.0	56.0	.....	34.9	27.4	.....	C. B. Hayes.
Deerfield	V. O.	19.5	24.6	21.3	40.4	60.6	66.1	74.8	65.0	56.1	47.9	36.2	25.8	44.9	Rev. A. Hazen.

Do	N. E. M. S.	19.0	24.7	28.9	41.3	63.5	67.6	76.4	66.6	57.8	48.0	36.1	26.8	46.4	S. J. Childs.
Dudley	V. O.	23.0	27.4	25.4	43.2	61.4	66.2	75.2	67.8	59.8	49.1	38.7	28.9	47.2	Conant Observatory.
Fall River	V. O.	25.7	28.9	30.7	41.5	56.4	63.0	72.1	66.3	57.8	50.3	39.9	31.9	47.0	C. F. S. Remington.
Do	N. E. M. S.	.....	.....	.....	.....	61.2	64.6	74.0	67.4	58.8	50.7	39.2	32.6	.....	P. Kieran.
Fitchburgh	N. E. M. S.	20.4	24.1	27.5	40.7	60.0	65.3	73.4	64.7	56.2	46.6	36.4	27.2	45.2	J. Fisher.
Do	N. E. M. S.	22.1	26.0	29.7	43.1	61.8	64.3	73.0	64.6	56.9	47.1	36.8	27.8	46.1	A. P. Mason.
Framingham	N. E. M. S.	21.8	27.9	30.6	44.1	61.2	66.2	76.3	67.0	58.0	49.8	39.6	29.6	47.7	Boston Water-Works.
Gilbertville	N. E. M. S.	19.5	24.8	27.9	.....	.....	66.6	73.4	.....	56.8	47.6	36.1	26.6	.....	W. E. Brown.
Groton	N. E. M. S.	.....	.....	30.4	42.2	60.6	65.3	75.0	65.9	57.7	48.2	38.1	28.2	.....	C. Woodley.
Do	N. E. M. S.	21.6	25.1	29.3	43.6	61.3	.....	.....	.....	.....	49.5	37.8	.....	.....	R. B. Pott and J. Binney.
Heath	V. O.	18.9	18.6	24.5	39.4	58.2	71.9	82.0	71.3	60.1	49.6	37.1	26.7	46.5	B. B. Cutler.
Lake Cochituate	N. E. M. S.	21.9	27.8	30.8	44.2	60.4	65.4	75.1	67.0	57.9	49.3	39.1	29.7	47.4	Boston Water-Works.
Lawrence	N. E. M. S.	20.2	25.0	29.8	42.6	60.6	65.5	74.5	65.4	55.8	47.5	37.8	28.2	46.1	Essex Company.
Lowell	N. E. M. S.	23.5	28.6	.....	43.8	.....	66.9	76.6	68.2	60.7	48.9	39.5	29.8	.....	Lowell Water-Works.
Do	N. E. M. S.	20.6	26.1	27.0	42.4	60.8	66.4	76.0	67.8	58.5	49.6	38.8	28.8	46.9	Prop. Locks and Canal.
Ludlow	N. E. M. S.	18.5	24.8	27.8	41.6	59.8	64.1	73.3	64.6	55.6	46.9	36.8	26.7	45.0	M. W. Graves.
Lynn	N. E. M. S.	23.3	27.4	30.8	42.6	57.5	63.6	72.2	65.3	57.4	48.6	39.7	31.1	46.6	D. Walden.
Manchester	N. E. M. S.	.....	.....	.....	.....	57.1	61.6	69.2	65.8	58.4	50.0	.....	.....	.....	T. J. Coolidge.
Mansfield	N. E. M. S.	.....	28.0	31.0	43.6	60.3	64.6	74.8	66.2	56.7	48.4	39.6	30.0	.....	I. H. White.
Middleborough	N. E. M. S.	.....	.....	.....	.....	.....	63.2	73.4	66.0	57.4	49.5	39.4	30.4	.....	Middleborough Water-Works.
Milton	V. O.	26.1	30.4	31.8	42.6	55.5	61.3	72.5	64.1	56.0	46.4	39.2	32.1	46.5	Rev. A. K. Teele.
Monson	N. E. M. S.	19.8	25.4	28.5	42.4	61.6	65.1	77.1	65.8	57.2	47.9	36.9	28.0	46.3	G. E. Fuller.
Nantucket	N. E. M. S.	31.4	33.0	33.6	44.0	57.8	64.0	73.3	69.0	62.0	54.6	44.2	36.0	50.2	H. Paddack.
New Bedford	V. O.	26.7	29.4	31.4	43.1	57.5	62.7	71.8	66.5	58.4	50.3	40.7	31.8	47.5	T. R. Rodman.
Do	N. E. M. S.	24.9	28.2	31.4	43.4	57.1	62.2	73.0	66.2	58.3	50.8	42.8	33.5	47.6	New Bedford Water-Works.
Newburyport	V. O.	22.9	26.5	30.2	42.1	58.0	63.6	72.3	65.4	57.5	48.5	38.6	30.0	46.3	F. V. Pike.
Northampton	N. E. M. S.	19.6	25.6	28.2	43.2	63.2	67.8	77.8	68.2	58.5	49.2	37.6	27.2	47.2	J. M. Clark.
Plymouth	N. E. M. S.	28.9	31.1	29.2	44.5	59.5	65.4	74.6	66.9	61.2	52.6	41.5	34.0	49.1	Miss L. B. Knapp.
Princeton	N. E. M. S.	.....	.....	24.0	39.2	59.4	62.4	71.1	64.6	56.1	46.2	35.8	26.3	.....	Mrs. J. O. Nest and M. Grimes.
Randolph	N. E. M. S.	23.4	28.3	33.2	43.0	61.3	63.8	74.0	.....	.....	48.2	37.3	29.8	.....	F. C. Granger.
Rowe	N. E. M. S.	19.1	21.7	23.9	36.9	57.8	63.1	71.1	61.2	52.6	43.3	33.2	25.4	42.4	J. Davis.
Salem	N. E. M. S.	23.7	26.8	.....	42.4	58.3	63.9	73.0	63.8	56.3	48.8	38.9	29.9	.....	J. P. Andrews.
Somerset	V. O.	26.5	30.2	33.0	45.3	62.0	68.1	77.5	70.4	62.1	52.6	41.3	32.4	50.1	E. Slade.
South Boston	N. E. M. S.	25.2	29.2	31.6	44.8	60.2	65.6	74.8	68.0	60.2	.....	.....	.....	.....	D. Reeves.
Springfield	N. E. M. S.	22.2	26.7	30.4	45.2	64.3	68.1	76.4	68.3	59.5	49.9	38.3	29.6	48.2	E. C. Wheeler.
Taunton	V. O.	26.1	30.1	31.8	43.6	58.7	64.0	73.3	66.4	58.5	50.3	40.2	31.9	57.9	E. U. Jones.
Do	V. O.	25.4	30.4	32.1	44.6	60.9	65.1	75.4	67.2	58.7	51.3	40.8	32.2	48.7	A. F. Sprague.
Do	N. E. M. S.	24.9	29.2	31.2	43.4	58.2	63.7	74.3	66.6	57.8	50.0	39.8	31.7	47.6	Taunton Water-Works.
Warwick	N. E. M. S.	17.8	22.2	.....	.....	.....	.....	.....	.....	53.5	45.2	36.1	25.2	.....	H. T. Lyche.
Wellesley	N. E. M. S.	21.9	26.7	30.4	43.5	59.1	64.3	74.4	.....	56.6	49.0	39.5	29.5	.....	Miss S. F. Whiting.
Westborough	V. O.	27.1	29.2	31.8	45.4	62.9	67.4	76.7	67.4	59.5	50.5	41.1	32.0	49.3	G. S. Newcomb.
Williamstown	V. O.	20.0	24.0	24.9	39.5	63.0	65.6	72.5	63.5	55.0	49.5	36.4	25.5	45.0	A. T. Safford and S. H. Seely.
Worcester	V. O.	21.1	25.1	24.2	40.7	58.8	62.0	76.0	.....	58.7	50.5	39.8	30.8	.....	J. B. Hall.
Michigan:															
Adrian	S. W. S.	.....	26.9	30.1	45.2	63.1	68.6	76.5	68.0	59.7	45.6	35.6	26.7	.....	W. H. Howard.
Alma	S. W. S.	.....	.....	26.2	42.0	61.6	67.0	73.7	64.6	.....	43.2	34.3	26.3	.....	P. M. Smith.
Athens	S. W. S.	.....	.....	29.5	47.7	60.7	68.6	77.4	67.4	58.9	.....	.....	.....	.....	E. H. Coller, M. D.
Benton Harbor	V. O.	25.8	29.0	31.6	47.3	64.0	71.0	77.5	70.4	.....	.....	.....	.....	.....	A. J. McClave.
Big Rapids	S. W. S.	.....	.....	.....	43.8	65.1	70.7	.....	67.7	57.7	43.2	33.8	26.7	.....	F. R. Fowler.
Brady, Fort	M. P.	6.4	12.4	16.5	35.3	57.7	63.0	69.4	61.9	53.9	.....	29.5	23.4	.....	U. S. Post Hospital.
Buchanan	S. W. S.	.....	.....	.....	.....	65.3	72.8	.....	.....	61.7	46.9	36.8	27.3	.....	V. E. David and C. F. Howe.
Calumet	S. W. S.	.....	.....	.....	.....	.....	.....	65.7	60.3	53.4	38.0	28.6	21.4	.....	E. G. Grierson.

Table of monthly and annual mean temperature for 1887—*Voluntary—State weather service—Military posts and Central and Southern Pacific Railroad stations*—Continued.

States and stations.	Character of stations.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Annual.	Authority.
Michigan—Continued.															
Cassopolis	S. W. S.	.....	.....	32.2	48.3	64.8	71.2	78.2	69.5	62.0	46.9	37.7	29.0	.....	H. J. Webb.
Central Mine	S. W. S.	.....	.....	.....	.....	61.2	62.1	.....	63.1	54.2	40.1	30.0	24.7	.....	E. T. W. Daume.
Charlevoix	S. W. S.	.....	.....	.....	.....	57.1	62.6	74.0	68.4	69.1	46.8	29.7	27.4	.....	E. F. Parmalee.
Ganges	S. W. S.	.....	.....	29.1	44.7	58.6	67.3	75.3	64.1	60.5	.....	.....	.....	.....	E. Hawley.
Gaylard	S. W. S.	.....	.....	.....	.....	61.0	64.5	68.7	61.5	54.8	39.8	30.4	23.9	.....	Dr. J. Robinson and F. A. Baldwin.
Grand Rapids	S. W. S.	.....	.....	29.4	45.2	65.6	71.1	.....	.....	.....	48.7	35.3	30.2	.....	F. M. Kendall.
Greenville	S. W. S.	.....	.....	27.7	45.5	65.8	71.2	76.6	68.6	.....	45.8	35.5	27.2	.....	S. Brothers.
Harrisville	V. O.	.....	19.3	23.5	39.0	56.3	62.9	70.9	64.3	56.5	42.9	34.1	.....	.....	D. W. Mitchell.
Hastings	S. W. S.	.....	.....	.....	.....	.....	70.1	77.2	68.3	58.2	45.8	36.2	28.8	.....	J. Bessner and F. R. Timmerman.
Jonesville	S. W. S.	.....	.....	31.1	44.4	61.9	68.2	74.8	66.9	60.4	46.5	37.6	26.4	.....	R. S. Munsell and R. Y. Coryell.
Kalamazoo	V. O.	27.0	27.5	33.0	47.0	66.0	69.0	71.0	72.5	62.5	49.0	38.0	27.4	49.2	W. A. Black.
Lansing	V. O.	18.3	24.4	27.8	45.3	64.2	69.4	75.8	67.1	58.7	45.2	36.6	27.6	46.7	Dr. H. B. Baker.
Marshall	V. O.	20.0	28.3	31.4	48.7	66.2	72.0	79.8	71.4	62.7	47.6	38.5	29.5	49.7	W. T. Drake.
Mottville	V. O.	22.1	22.1	31.0	48.2	52.0	68.0	75.0	69.2	58.8	45.7	36.0	27.6	46.3	J. A. Hartzler.
Mount Morris	S. W. S.	.....	.....	.....	.....	.....	.....	74.8	66.9	59.0	44.8	35.4	27.3	.....	Dr. H. H. Bardwell.
Olivet	S. W. S.	.....	.....	.....	.....	.....	69.1	75.7	67.6	58.2	45.0	36.1	27.4	.....	Olivet College.
Ovid	S. W. S.	.....	.....	27.0	42.6	62.9	68.1	.....	.....	.....	44.4	35.9	27.7	.....	W. H. Faxon.
Petersburgh	S. W. S.	.....	.....	.....	.....	63.0	68.1	76.1	68.0	59.1	45.8	36.8	28.0	.....	S. L. Jones.
Romeo	S. W. S.	.....	.....	.....	.....	[d]70.4	72.2	.....	69.1	59.2	46.5	37.7	29.7	.....	O. D. Thompson.
Saint John's	S. W. S.	.....	.....	28.2	46.5	64.8	70.0	76.6	67.6	58.8	44.1	36.6	26.8	.....	D. H. and A. O. Hunt.
Saint Louis	S. W. S.	.....	.....	27.8	44.2	63.4	69.0	75.5	67.1	57.2	45.0	36.1	28.7	.....	B. H. Scoville.
Sand Beach	S. W. S.	.....	.....	.....	.....	59.9	64.2	74.3	66.2	59.4	45.1	36.0	28.9	.....	N. P. Arnold.
Snowflake	S. W. S.	.....	.....	.....	.....	.....	.....	69.4	62.2	54.9	41.3	32.8	26.7	.....	W. W. Johnson.
Swartz Creek	V. O.	17.8	23.0	27.0	43.7	63.0	67.8	74.7	66.2	.....	.....	.....	.....	.....	G. G. Gordon, M. D.
Thornville	V. O.	19.2	24.3	27.6	44.9	64.6	74.2	76.2	67.8	58.6	46.1	37.2	.....	.....	J. S. Caulkins, M. D.
Traverse City	V. O.	.....	.....	.....	.....	57.0	64.0	71.0	65.6	57.0	43.0	.....	28.0	.....	S. E. Wait.
Minnesota:															
Albert Lea	S. W. S.	2.1	9.9	27.5	45.5	61.6	.....	72.1	66.0	58.3	40.0	.....	.....	.....	Pres. R. B. Abbott.
Delano	S. W. S.	.....	.....	.....	44.8	62.7	.....	73.6	65.3	56.6	40.9	29.2	15.2	.....	A. W. Wittman.
Excelsior	S. W. S.	− 0.4	8.6	25.8	.....	65.2	.....	75.6	66.9	59.1	.....	29.8	15.5	.....	Dr. J. R. Walker.
Mankato	S. W. S.	2.9	10.5	28.8	47.5	63.5	.....	72.7	[a]67.3	[b]58.3	42.8	32.0	16.6	.....	Prof. H. P. Cushing.
Minneapolis	V. O.	0.2	9.0	25.8	44.4	63.7	69.7	74.8	66.0	57.2	40.9	29.5	15.9	41.4	W. Cheney.
Morris	S. W. S.	− 7.5	2.1	24.7	43.0	61.6	.....	72.0	64.7	57.1	39.9	28.3	8.4	.....	D. T. Wheaton.
Northfield	S. W. S.	1.8	8.9	27.3	46.0	62.9	.....	74.7	67.8	56.9	41.7	29.9	17.4	.....	M. D. Snedicor and E. L. Porter.
Park Rapids	S. W. S.	− 9.5	2.9	.....	[a]40.8	.....	.....	[f]67.9	61.6	.....	[a]37.8	.....	.....	.....	P. A. Walling, M. D.
Pine River Dam	S. W. S.	.....	.....	[a]28.6	40.4	61.5	.....	72.8	65.0	58.5	39.7	25.0	9.4	.....	N. McKay and N. Johnson.
Pokegama Falls	S. W. S.	.....	.....	.....	.....	58.8	.....	[a]66.5	59.3	51.8	34.7	.....	7.9	.....	O. Johnson.
Red Wing	S. W. S.	2.9	11.7	28.0	46.4	64.2	.....	73.8	65.9	58.0	42.7	31.8	18.7	.....	Prof. O. Whitman.
Rolling Green	S. W. S.	.....	.....	.....	44.8	63.2	.....	73.1	66.9	59.1	41.5	29.0	13.4	.....	Capt. F. Wherland.

Sherburne	S. W. S.	− 0.2	8.3	27.9	46.7	64.5	.....	75.5	68.3	60.6	42.2	29.9	14.1	.....	J. Peacock.
Snelling, Fort	M. P.	− 1.1	8.4	27.1	46.4	65.1	70.7	75.1	68.0	58.5	41.8	30.4	16.1	42.2	U. S. Post Hospital.
Winona	S. W. S.	3.5	.....	30.1	*46.4	*69.2	.....	.....	.....	.....	†41.0	30.6	.....	.....	Prof. J. M. Holtsinger.
Mississippi:															
Artonish Plantation	S. W. S.	48.0	63.0	63.0	68.0	74.0	.....	.....	.....	.....	.....	58.0	50.0	.....	B. P. Swan.
Batesville	S. W. S.	40.0	52.0	55.0	62.0	73.0	76.0	81.0	80.0	75.0	61.0	50.0	.....	.....	H. Harris.
Biloxi	V. O.	48.0	63.0	61.0	68.0	75.0	79.0	81.0	82.0	78.0	68.0	59.0	51.0	67.8	Dr. R. G. Hinsdale.
Edwards	S. W. S.	44.0	61.0	60.0	66.0	76.0	80.0	83.0	83.0	77.0	64.0	.....	.....	.....	C. W. Barber.
Greenville	S. W. S.	44.0	58.0	60.0	66.0	76.0	80.0	.....	80.0	76.0	61.0	54.0	.....	.....	Prof. W. M. Green, jr.
Hermanville	S. W. S.	.....	.....	*54.0	66.0	73.0	81.0	83.0	81.0	77.0	64.0	55.0	50.0	.....	M. B. Herman.
Holly Springs	S. W. S.	42.0	53.0	56.0	.....	.....	.....	.....	80.0	73.0	60.0	.....	.....	.....	J. M. Mickle.
Jackson	S. W. S.	.....	61.0	58.0	.....	76.0	80.0	82.0	.....	.....	.....	.....	45.0	.....	W. J. Brown, jr.
Lamar	S. W. S.	44.0	56.0	57.0	.....	.....	.....	82.0	82.0	77.0	62.0	.....	.....	.....	A. M. Clayton.
Palo Alto	V. O.	.....	56.0	59.0	67.0	76.0	79.0	83.0	81.0	78.0	61.0	52.0	43.0	.....	W. H. Hill.
Starkville	S. W. S.	.....	.....	.....	63.0	74.0	74.0	..	81.0	.....	61.0	54.0	43.0	.....	Central Station.
University	S. W. S.	.....	.....	.....	.....	75.0	76.0	80.0	79.0	76.0	60.0	53.0	42.0	.....	Prof. R. Fulton.
Waynesborough	S. W. S.	.....	61.0	59.0	67.0	75.0	80.0	82.0	81.0	74.0	62.0	.....	.....	.....	W. G. Southall.
West Point	S. W. S.	46.0	59.0	59.0	68.0	77.0	81.0	84.0	83.0	81.0	62.0	56.0	45.0	66.8	J. H. L. Gerdine.
Missouri:															
Conception	V. O.	11.9	23.2	38.9	54.3	67.3	72.1	78.2	73.6	64.7	50.0	40.3	24.2	49.9	Rev. M. Eckstine.
Fayette	S. W. S.	.....	.....	.....	56.5	69.6	.....	.....	77.0	69.1	53.6	43.5	28.6	.....	T. B. Smith.
Houstonia	S. W. S.	22.5	32.7	43.6	56.3	67.5	73.0	78.7	75.4	.....	.....	.....	.....	.....	S. J. Spurgeon.
Ironton	S. W. S.	24.4	33.9	39.5	51.4	61.9	66.1	72.1	68.4	62.2	45.6	36.3	27.1	49.1	W. H. Delano.
Kirksville	S. W. S.	16.9	28.3	39.1	54.1	66.4	72.9	77.9	74.0	65.6	49.4	40.6	25.8	50.9	C. Patterson.
Louisiana	S. W. S.	23.2	32.2	49.5	56.5	67.5	72.1	80.1	73.1	67.3	50.6	41.9	29.8	53.6	M. J. Hassler.
Miami	S. W. S.	22.0	32.0	41.0	56.0	68.0	76.0	79.0	75.7	68.0	50.9	.....	.....	.....	A. W. Sullivan.
Mound City	S. W. S.	17.4	26.3	.....	.....	69.4	73.4	.....	.....	.....	52.1	42.4	25.0	.....	L. Kancher.
Oregon	S. W. S.	17.2	25.6	40.2	56.4	67.8	.....	78.8	73.6	66.0	51.9	41.7	25.7	.....	Mrs. William Kancher.
Saint Louis	S. W. S.	27.2	38.6	46.1	57.8	70.6	75.9	82.5	79.1	71.2	55.7	45.4	32.1	56.8	Central Station.
Sedalia	S. W. S.	13.6	34.6	42.7	57.2	69.5	75.6	80.9	77.7	.....	56.9	46.7	.....	.....	C. G. Taylor.
Springfield	S. W. S.	38.7	34.3	42.2	50.9	63.6	62.0	71.3	66.8	70.3	53.9	44.8	.....	.....	E. F. Copp.
Do	V. O.	34.5	39.0	45.8	59.4	65.2	70.9	.....	.....	.....	.....	45.8	31.5	.....	E. M. Shepard and T. S. Collins.
Troy	S. W. S.	.....	.....	44.3	54.7	.....	68.7	77.0	75.2	67.6	.....	41.5	29.4	.....	I. A. Ward.
Montana:															
Keogh, Fort	M. P.	8.6	−7.5	36.1	48.5	61.7	70.1	74.2	72.1	63.7	44.2	31.1	14.6	42.9	U. S. Post Hospital.
Missoula, Fort	M. P.	25.6	11.4	39.5	45.2	55.8	59.7	67.5	65.0	55.6	41.8	31.3	26.7	43.8	Do.
Shaw, Fort	M. P.	18.6	2.4	40.0	45.4	56.1	60.0	68.5	64.4	57.8	45.1	34.0	19.9	42.7	Do.
Nebraska:															
Brownville	V. O.	16.8	23.5	40.9	57.0	69.0	77.6	83.4	76.6	70.0	54.5	45.2	28.0	53.5	George D. Carrington.
Crete	V. O.	.....	19.0	37.8	55.1	64.7	71.2	76.2	72.3	64.9	.....	.....	.....	.....	Prof. Goodwin Swezy.
De Soto	V. O.	10.8	17.4	37.0	54.3	66.4	72.8	76.5	72.1	64.3	48.4	36.4	21.9	48.2	Charles Seltz.
Fairbury	V. O.	29.8	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Fremont	V. O.	11.6	18.8	37.2	52.9	62.4	71.2	78.9	71.2	64.4	48.1	37.8	18.0	47.3	Isaac E. Heaton.
Genoa	V. O.	10.9	15.1	35.9	52.7	65.1	72.1	75.7	70.6	63.4	47.8	35.3	20.1	47.1	George S. Truman.
Hay Springs	V. O.	17.1	14.2	37.1	44.5	56.5	66.3	70.7	64.8	58.9	40.4	†28.9	18.4	43.2	William Waterman.
Lincoln	V. O.	14.7	20.1	37.3	54.8	65.2	.....	.....	.....	.....	50.0	38.6	23.5	.....	University of Nebraska.
Marquette	V. O.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Niobrara, Fort	M. P.	14.6	13.0	37.0	49.5	64.6	72.5	76.6	67.7	63.1	48.2	34.3	19.6	46.7	U. S. Post Hospital.
Robinson, Fort	M. P.	21.2	18.4	41.2	49.1	61.0	71.7	71.2	68.3	63.4	44.9	33.7	24.3	47.4	Do.
Sidney, Fort	M. P.	23.4	20.4	40.6	48.2	59.7	70.2	72.7	68.7	61.8	44.9	35.6	24.6	47.6	Do.
Tecumseh	V. O.	17.8	22.5	38.5	55.6	68.1	74.7	80.3	74.0	67.0	50.8	39.3	24.8	51.1	W. L. Dunlap.

Table of monthly and annual mean temperature for 1887—*Voluntary—State weather service—Military posts and Central and Southern Pacific Railroad stations*—Continued.

States and stations.	Character of stations.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Annual.	Authority.
Nevada:															
Battle Mountain	R. R.	33.9	30.6	44.7	46.2	56.9	61.7	76.2	69.6	.....	49.8	38.4	28.2	.....	Pacific Railway system.
Beowawe	R. R.	34.2	32.2	49.4	48.3	59.8	68.8	76.6	72.5	63.2	50.1	35.3	21.8	51.0	Do.
Brown's	R. R.	37.9	33.4	51.7	54.6	65.0	74.4	82.7	76.7	66.5	55.7	42.0	.....	.....	Do.
Carlin	R. R.	34.4	29.8	44.8	46.1	59.0	66.8	74.3	72.0	60.0	45.7	33.4	20.1	48.9	Do.
Carson City	V. O.	36.5	27.5	46.4	48.1	58.7	65.4	71.5	67.2	59.0	49.2	40.2	31.2	50.1	Charles W. Friend.
Elko	R. R.	30.0	26.5	41.9	46.5	60.0	71.5	80.6	71.6	59.6	44.7	26.7	21.5	48.4	Pacific Railway system.
Golconda	R. R.	43.5	37.2	52.1	53.5	66.9	71.8	81.4	78.7	67.3	58.9	49.3	39.7	58.4	Do.
Halleck	R. R.	32.4	24.3	.....	50.8	63.5	69.9	76.2	73.3	61.2	46.2	25.3	15.5	.....	Do.
Hawthorne	R. R.	39.9	38.7	50.8	51.8	60.9	67.1	78.6	73.3	61.6	54.1	46.6	36.1	55.0	Do.
Hot Springs	R. R.	35.6	29.2	43.9	49.3	70.2	68.1	75.3	73.8	59.8	47.4	40.3	38.2	52.6	Do.
Humboldt	R. R.	36.3	31.4	50.3	55.1	59.4	63.2	72.6	71.2	62.3	52.3	41.5	27.2	51.9	Do.
McDermit, Fort	M. P.	31.1	25.3	43.3	43.5	52.3	61.3	73.4	68.1	57.8	50.7	39.4	27.7	47.8	U. S. Post Hospital.
Otego	R. R.	22.3	20.3	35.7	40.4	[j]55.5	.....	74.7	[d]72.9	.....	.....	.....	.....	.....	Pacific Railway system.
Palisade	R. R.	34.2	30.4	46.0	54.7	64.5	66.6	74.0	73.4	61.7	44.8	33.7	16.7	50.1	Do.
Reno	R. R.	32.8	26.3	41.1	45.4	53.2	65.6	68.5	56.7	46.6	47.6	42.8	32.3	46.7	Do.
Tecoma	R. R.	31.0	27.4	48.0	50.9	66.6	73.5	82.8	79.5	67.6	53.0	36.6	25.8	53.6	Do.
Toana	R. R.	27.7	26.5	46.4	44.4	61.0	68.0	77.3	75.0	66.3	48.5	34.9	25.7	50.1	Do.
Wadsworth	R. R.	38.1	32.4	47.5	51.4	64.0	71.8	79.2	75.4	66.0	54.4	44.6	35.0	55.0	Do.
Wells	R. R.	33.6	30.2	40.1	48.0	64.3	68.0	72.7	69.0	50.6	44.1	15.9	3.0	45.0	Do.
Winnemucca	R. R.	37.3	32.0	48.3	51.7	56.3	67.4	77.4	73.5	59.5	55.1	40.9	29.7	52.4	Do.
New Hampshire:															
Berlin Mills	V. O.	12.6	[a]17.7	22.7	35.4	56.5	61.8	72.3	60.4	50.5	43.0	28.7	21.2	40.2	Q. A. Bridges.
Concord	V. O.	19.0	24.0	28.0	41.4	60.0	63.8	74.3	64.5	56.0	48.8	38.0	29.5	45.6	W. L. Foster.
Do	V. O.	.....	24.0	28.2	42.7	60.0	65.5	74.2	66.2	55.2	.....	.....	.....	.....	A. L. Downing.
Dover	V. O.	.....	24.3	.....	41.5	61.6	67.3	76.0	68.0	59.3	49.8	37.2	28.1	.....	G. W. Caswell.
Hanover	N. E. M. S.	13.0	18.2	26.7	36.6	59.6	64.6	.....	63.0	54.0	45.1	32.7	22.4	.....	C. S. Cook, C. F. Chase.
Manchester	N. E. M. S.	19.2	23.8	27.9	41.3	60.4	65.2	74.3	65.6	56.3	47.2	36.3	27.8	45.4	S. D. Lord.
Do	N. E. M. S.	17.6	23.1	27.2	41.8	60.5	65.6	73.0	66.1	56.2	47.6	35.8	26.6	45.0	W. Little.
Nashua	V. O.	19.9	24.6	28.6	41.8	60.0	65.0	73.7	65.5	56.9	47.8	37.1	27.7	45.7	C. H. Webster.
Do	N. E. M. S.	19.8	24.0	28.0	41.4	60.0	66.0	75.2	67.1	57.2	48.8	.....	.....	.....	Nashua Manufacturing Company.
Quincy	N. E. M. S.	12.0	16.0	20.6	33.9	57.9	62.6	71.8	61.8	53.2	.....	.....	.....	.....	Miss M. H. Dix.
Shelburne	N. E. M. S.	10.6	15.2	23.8	36.0	57.4	64.4	71.4	62.8	54.1	44.1	33.4	23.0	41.4	W. F. Carr, A. C. Lary.
Stratford	N. E. M. S.	14.1	18.8	24.1	37.2	60.4	65.8	74.2	65.6	54.8	46.5	34.6	22.6	43.2	N. B. Waters.
Walpole	N. E. M. S.	15.2	18.0	23.4	38.8	60.3	63.6	72.2	64.2	54.2	44.2	32.7	22.2	42.4	E. A. Knowlton.
West Milan	N. E. M. S.	10.6	13.7	21.9	34.8	55.9	61.0	68.6	59.6	51.0	42.8	31.8	20.9	39.4	A. A. Higgins.
New Jersey:															
Beverly	V. O.	28.9	34.9	34.5	48.0	65.2	70.2	78.1	71.2	62.4	53.1	41.4	33.8	51.8	Prof. C. F. Richardson.
Billingsport Light-House	S. W. S.	28.4	34.1	35.8	49.5	66.8	72.2	82.5	74.1	63.8	55.4	43.2	35.6	53.4	Joseph H. Preston.
Bordentown	S. W. S.	24.3	32.4	30.8	45.3	62.8	66.8	75.0	68.9	59.0	49.5	39.1	31.9	48.8	Dr. M. S. Simpson.

Bridgetown	S. W. S.	31.0	38.0	37.0	48.0	68.0	72.0	82.0	74.0	65.0	56.0	44.0	37.0	54.3	H. H. Jordan.
Clayton	V. O.	29.1	35.2	34.1	47.5	64.8	69.8	79.6	71.5	62.4	52.8	41.0	34.5	51.9	W. T. Wilson.
Dover	V. O.	24.7	29.5	29.6	44.5	61.7	67.2	75.0	64.9	58.3	48.5	38.2	30.4	47.7	W. C. Harris.
Egg Harbor City	V. O.	31.3	36.9	35.9	46.5	61.7	67.5	77.2	69.7	61.4	53.0	41.4	34.7	51.4	H. Y. Postma.
Elizabeth	S. W. S.	.....	33.9	31.9	45.1	60.3	67.1	75.4	67.8	60.3	49.9	38.3	32.5	.....	N. L. Wilson, M. D.
Gillette	S. W. S.	26.7	31.7	32.4	47.7	63.4	[a]67.8	77.4	69.3	59.6	.....	40.7	31.3	.....	R. W. Cornish.
Hanover	S. W. S.	.....	.....	[a]31.0	44.1	62.9	68.1	76.9	68.3	57.6	[a]48.6	37.8	30.3	.....	M. M. Cook.
Harrisville	S. W. S.	.....	37.3	33.2	45.1	63.5	68.4	.....	70.6	61.0	52.4	41.6	.....	.....	J. W. Harris.
Imlaystown	S. W. S.	32.0	34.7	34.0	46.3	64.1	67.7	76.6	69.8	61.3	52.4	41.1	33.7	51.1	Dr. H. G. Norton.
Lambertville	S. W. S.	.....	34.5	33.1	47.0	65.1	.....	76.6	69.4	60.6	52.2	41.0	34.6	.....	Dr. G. H. Larison.
Locktown	S. W. S.	26.7	29.7	29.3	43.2	61.2	66.3	74.0	66.6	57.8	47.4	36.8	29.2	47.4	G. W. Hockenbury.
Lakewood	V. O.	37.5	35.8	39.8	53.0	65.2	.....	.....	.....	.....	54.8	45.5	.....	.....	Dr. W. C. Stone.
Matawan	S. W. S.	33.7	36.3	35.1	46.5	60.9	.....	76.5	68.4	60.2	53.8	44.3	38.3	.....	Prof. J. C. Rice.
Moorestown	V. O.	28.4	34.4	24.1	47.3	63.9	68.6	76.8	70.3	61.5	52.0	41.3	33.5	51.0	T. J. Beans.
New Brunswick	S. W. S.	27.2	32.1	33.3	47.1	62.5	68.0	77.5	69.9	61.9	52.6	42.0	33.5	50.6	Prof. G. H. Cook.
Do	S. W. S.	26.9	32.0	33.3	47.4	62.8	[b]68.3	[f]78.0	[e]71.2	61.5	51.5	38.8	32.9	50.4	Prof. Austin Scott, Ph. D.
Newark	S. W. S.	28.8	33.5	34.2	48.2	65.3	69.7	.....	73.1	63.3	54.5	43.4	34.9	.....	F. W. Ricord.
Ocean City	S. W. S.	[c]35.9	37.5	36.0	47.8	61.0	67.0	76.9	75.1	67.1	58.9	45.8	38.5	54.0	William Lake.
Oceanic	S. W. S.	.....	.....	.....	47.2	62.6	68.1	79.0	73.0	63.9	54.4	43.4	34.6	.....	Rev. S. W. Knipe.
Do	S. W. S.	.....	36.6	35.3	46.4	59.4	66.5	.....	72.8	.....	.....	.....	.....	.....	J. E. Parmly.
Paterson	V. O.	29.0	34.5	33.7	49.0	64.7	69.6	77.7	.....	61.5	51.6	42.0	34.4	.....	Prof. A. B. Wiggin.
Princeton	S. W. S.	27.8	32.9	33.4	47.4	64.7	.....	.....	.....	.....	53.4	41.2	.....	.....	Malcolm McNeill.
Rancocas	S. W. S.	27.0	33.0	.....	.....	60.5	66.0	.....	69.0	60.0	46.5	40.5	32.5	.....	Spencer Haines.
Readington	V. O.	31.6	35.7	36.1	51.5	67.5	72.0	79.6	73.6	64.4	[1]57.2	44.5	35.2	54.1	John Fleming.
Salem	V. O.	32.2	38.5	38.2	51.5	68.3	71.9	79.0	71.8	62.8	56.7	41.3	34.9	53.9	S. L. Richmond.
Somerville	S. W. S.	27.1	32.1	32.7	46.4	62.5	68.1	76.9	69.2	61.1	51.4	41.2	34.6	50.3	A. C. Lindsley.
South Orange	V. O.	28.7	32.7	33.4	46.8	63.0	67.1	75.4	68.9	61.2	53.0	42.4	33.2	50.5	Dr. W. J. Chandler.
Tenafly	S. W. S.	.....	29.0	31.8	45.9	.....	.....	74.2	69.1	58.6	49.8	38.8	32.1	.....	Arthur D. Atwood.
Union	S. W. S.	26.7	31.0	31.7	45.6	61.8	67.1	75.7	68.8	60.1	52.1	40.1	32.4	49.4	F. L. Dunbar.
Vineland	V. O.	32.0	37.5	37.9	51.5	67.2	70.7	76.9	74.2	61.8	55.3	43.3	37.4	53.8	Dr. O. H. Adams.
New Mexico:															
Bayard, Fort	M. P.	43.9	43.3	56.4	55.9	65.8	69.8	75.9	74.7	69.9	62.0	52.5	37.7	59.0	United States Post Hospital.
Deming	R. R.	47.4	51.3	61.5	66.4	71.4	81.4	88.0	82.8	75.2	65.3	54.8	39.6	65.4	Pacific Railway system.
Lordsburg	R. R.	.....	43.2	53.5	62.9	73.0	84.0	83.9	80.9	74.8	61.3	50.4	37.6	.....	Do.
Selden, Fort	M. P.	43.1	47.0	57.1	62.0	71.3	81.9	81.7	79.6	74.2	61.8	49.8	40.4	62.5	United States Post Hospital.
Union, Fort	M. P.	32.2	34.6	45.5	49.8	58.4	66.0	74.2	63.9	59.8	51.8	44.1	30.7	50.9	Do.
Wingate, Fort	M. P.	31.4	32.7	44.4	47.3	57.0	67.5	68.0	65.8	59.9	48.7	40.3	23.7	48.9	Do.
New York:															
Auburn	V. O.	23.1	27.0	28.6	43.5	63.2	65.7	73.9	65.4	57.8	48.8	39.7	30.9	47.3	George Casey.
Boyd's Corners	V. O.	23.7	28.9	29.8	45.0	65.8	69.2	76.7	69.1	59.0	50.1	39.5	30.8	49.0	Thomas Manning.
Brooklyn	V. O.	31.3	35.1	34.9	48.9	64.4	71.0	.....	.....	.....	55.0	45.5	34.8	.....	Adelphi Academy.
Do	V. O.	.....	32.3	32.9	46.9	62.5	68.4	75.8	.....	.....	.....	.....	.....	.....	S. A. Dunn.
Columbus, Fort	M. P.	28.7	32.5	33.7	.....	62.1	68.6	76.8	71.5	63.0	53.5	42.8	35.1	.....	United States Post Hospital.
Cooperstown	V. O.	18.0	22.5	24.0	38.5	60.7	65.5	73.0	64.0	54.7	44.7	34.5	25.7	43.8	G. P. Keese.
Factoryville	V. O.	22.7	28.9	31.4	42.9	65.8	68.9	74.5	65.5	55.9	46.1	36.3	29.6	47.4	T. P. Yates.
Humphrey	V. O.	20.1	25.6	25.9	40.3	61.2	66.2	75.3	66.2	57.9	45.2	36.0	27.6	45.6	Charles E. Whitney.
Ithaca	V. O.	22.9	26.9	27.4	42.4	63.4	66.9	74.8	65.8	56.6	46.3	37.6	29.5	46.7	English Dept. Cornell University.
Le Roy	V. O.	21.2	24.5	24.7	42.1	63.5	63.8	.....	.....	57.8	45.4	36.7	27.7	.....	F. M. Comstock.
Madison Barracks	M. P.	14.7	21.4	25.6	.....	60.5	65.5	78.2	70.7	59.0	.....	36.3	26.7	.....	United States Post Hospital.
Menand Station	V. O.	19.6	23.3	26.8	42.3	64.7	68.3	75.7	66.5	58.3	48.4	38.3	26.8	46.6	C. B. Tillinghast.
Niagara, Fort	M. P.	23.0	26.8	28.3	41.8	56.6	65.5	75.6	69.6	60.2	48.5	38.9	31.5	47.2	United States Post Hospital.
North Volney	V. O.	19.0	22.8	24.9	40.6	61.8	65.4	73.9	63.7	57.3	42.4	36.7	27.2	44.6	J. M. Patrick.

Table of monthly and annual mean temperature for 1887—*Voluntary—State weather service—Military posts and Central and Southern Pacific Railroad stations*—Continued.

States and stations.	Character of stations.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Annual.	Authority.
New York—Continued.															
Palermo	V. O.	17.0	20.9	23.0	38.9	60.2	64.8	72.6	63.5	54.7	41.9	33.1	25.4	43.0	E. B. Bartlett.
Palmyra	V. O.	23.4	26.4	29.9	46.0	66.1	69.3	77.3	71.3	60.2	48.1	39.0	30.3	48.9	L. D. Cummings.
Plattsburg Barracks	M. P.	14.7	18.5	23.6	38.0	60.9	65.4	73.2	65.4	57.7	46.0	33.7	21.5	43.2	United States Post Hospital.
Setauket	V. O.	29.2	32.3	32.5	45.2	60.1	65.3	75.4	70.0	61.6	53.2	42.9	36.0	50.3	S. B. Strong.
Utica	V. O.	17.3	19.0	23.1	36.1	62.9	63.7	71.8	62.0	51.2	42.8	34.3	25.3	42.5	Thomas Birt.
West Point	M. P.	24.5	28.8	30.9	44.5	64.5	67.7	75.6	69.2	60.3	.....	40.5	30.7	.....	United States Post Hospital.
White Plains	V. O.	26.2	33.3	34.1	47.9	65.7	67.7	76.9	69.3	61.2	53.7	43.6	36.2	51.3	Prof. O. R. Willis.
North Carolina:															
Chapel Hill	V. O.	39.1	48.1	43.7	58.3	70.7	.....	.....	.....	69.2	57.0	48.0	42.1	.....	Prof. J. W. Gore.
Hot Springs	V. O.	.....	.....	.....	.....	.....	71.1	75.8	72.6	69.5	55.0	47.8	40.3	.....	Dr. C. F. McGahn.
Lenoir	V. O.	30.4	46.5	.....	60.9	67.8	63.6	.....	70.6	65.6	54.0	42.8	37.7	.....	Dr. R. L. Beall.
Lincolnton	V. O.	32.7	48.2	43.6	55.1	68.4	73.8	78.9	73.2	66.2	53.6	43.2	41.7	56.6	Dr. R. L. Standemayer.
Raleigh	V. O.	41.0	49.0	49.0	50.0	73.3	78.0	82.0	78.0	71.0	59.0	52.0	43.0	61.2	Thomas C. Harris.
Reidsville	V. O.	28.2	.....	43.5	55.7	66.9	69.0	70.0	74.8	69.6	.....	.....	.....	.....	Prof. T. J. Norcom.
Statesville (near)	V. O.	35.7	46.4	45.2	56.9	68.9	74.3	79.1	73.6	67.9	55.0	46.6	39.6	57.4	W. A. Eliason.
Tarboro	V. O.	39.7	49.0	46.8	56.6	70.1	75.2	80.6	75.1	68.8	58.9	48.5	43.3	59.4	E. V. Zoeller.
Wake Forest	V. O.	39.8	49.2	47.9	56.4	70.7	.....	80.8	.....	.....	.....	.....	.....	.....	Prof. W. G. Simmons.
Weldon	V. O.	38.8	46.2	44.8	55.1	70.6	74.2	80.8	75.3	68.8	56.3	45.3	40.1	58.0	T. A. Clark.
Ohio:															
Akron	S. W. S.	.....	.....	.....	.....	65.6	69.2	77.1	68.5	60.7	48.3	38.9	31.1	.....	Prof. C. S. Howe.
Bangorville	S. W. S.	23.4	32.0	32.4	48.2	64.0	68.4	75.8	68.8	62.0	47.3	36.7	28.7	49.0	S. M. Painter.
Canton	S. W. S.	24.8	33.6	33.3	47.9	65.0	68.3	76.3	68.5	61.0	47.3	37.9	31.6	49.6	C. F. Stokey.
Clarksville	S. W. S.	28.5	37.3	38.9	52.0	67.1	71.8	78.9	72.6	65.1	50.2	40.9	32.9	53.0	E. T. M. Williams.
Cleveland	V. O.	25.7	32.1	31.7	45.8	62.7	68.2	75.9	68.2	60.6	49.6	40.3	32.2	49.4	G. A. Hyde.
College Hill	V. O.	34.2	39.6	40.8	56.4	71.0	74.8	86.0	76.6	67.2	52.4	45.1	32.2	56.4	John W. Hammitt.
Do	S. W. S.	27.0	37.0	39.1	52.2	67.3	73.2	80.4	73.6	66.4	49.9	41.6	31.7	53.2	Prof. A. D. Morrill.
Dayton	S. W. S.	26.9	36.8	38.0	51.7	68.2	74.7	83.6	73.1	65.6	50.3	40.3	32.3	53.5	Mrs. Edith E. L. Boyer.
Elyria	V. O.	32.7	31.0	40.2	55.6	73.5	78.4	83.5	80.9	70.7	61.2	48.3	36.6	57.7	Charles W. Goodspeed.
Garrettsville	V. O.	22.5	30.1	28.6	44.1	61.5	65.3	72.7	64.7	57.5	45.0	36.4	28.7	46.4	S. M. Luther.
Georgetown	S. W. S.	29.2	39.5	41.0	52.6	68.0	72.7	79.2	73.8	67.3	51.8	41.1	33.4	55.0	Dr. Thomas W. Gordon.
Greenville	S. W. S.	24.3	33.3	36.1	49.8	64.8	70.3	77.0	69.2	62.3	47.2	38.2	29.2	50.1	C. L. Katzenberger.
Hanging Rock	S. W. S.	32.3	41.2	40.1	49.7	65.8	68.9	76.4	70.7	63.1	49.3	39.4	34.1	52.6	James Bull.
Hiram	V. O.	22.9	30.2	30.0	44.8	62.5	67.0	.....	68.3	59.9	46.9	36.9	29.3	.....	Prof. G. H. Colton.
Jacksonborough	V. O.	24.6	35.1	36.5	52.1	67.4	73.1	80.2	73.9	63.0	52.5	40.0	30.0	52.4	Dr. J. B. Owsley.
Jefferson	S. W. S.	.....	29.1	29.0	43.1	61.7	65.6	73.9	66.2	58.3	46.5	37.6	29.5	.....	E. C. Wade.
Lima	S. W. S.	27.1	36.1	57.9	60.9	67.0	72.8	72.6	70.2	70.2	54.3	.....	.....	.....	F. Y. Davis.
Logan	S. W. S.	28.7	37.9	38.8	49.9	66.8	69.2	76.8	72.6	65.6	49.8	38.7	32.8	52.3	Dr. James Little.
McConnellsville	S. W. S.	29.3	38.9	38.4	50.1	67.6	74.9	78.9	74.0	66.2	52.6	39.8	32.5	53.6	C. H. Morris.
Marietta	S. W. S.	31.5	40.7	39.7	52.4	68.5	71.7	79.6	72.9	66.1	50.7	40.4	32.7	53.9	Prof. T. D. Biscoe.

Napoleon	V. O.	24.2	29.5	33.9	48.5	66.3	72.4	80.4	71.1	62.3	48.4	39.3	30.3	50.6	Dr. T. C. Hunter.
New Alexandria	S. W. S.	26.6	35.2	35.1	50.6	68.3	70.3	78.2	71.3	64.2	50.6	40.1	31.2	51.8	Joseph A. Hook.
West Bremen	S. W. S.	23.3	34.7	.....	51.0	.....	.....	75.3	70.9	62.8	46.5	37.0	29.3	.....	C. W. Williamson.
New Comerstown	S. W. S.	26.8	36.4	35.9	48.2	65.8	67.7	77.5	70.0	61.4	47.8	36.9	31.2	50.5	Dr. A. M. Beers.
North Lewisburg	V. O.	23.2	34.6	37.7	52.7	67.8	71.2	81.1	72.5	65.9	50.6	40.9	30.5	52.4	H. D. Gowey.
Oberlin	S. W. S.	24.8	32.3	32.1	46.2	62.8	68.4	76.6	68.1	60.7	48.2	38.8	30.3	49.1	Prof. F. F. Jewitt.
Paulding	S. W. S.	21.7	30.4	33.7	48.4	64.4	70.9	77.9	68.3	61.4	46.6	36.7	27.2	49.0	L. E. Hitchcock.
Pomeroy	S. W. S.	.....	40.7	43.2	56.3	72.7	76.2	83.6	78.7	70.5	54.3	44.3	36.2	.....	Dr. D. N. Allard.
Portsmouth	V. O.	33.0	42.0	42.3	52.5	67.8	71.4	78.0	72.2	65.2	51.6	42.5	35.6	54.5	Dr. D. B. Cotton.
Quaker City	S. W. S.	27.9	36.6	36.4	51.2	67.1	69.1	78.2	71.4	64.6	50.5	40.8	32.4	52.2	Joel Hall.
Ruggles	V. O.	23.2	30.0	31.1	43.5	60.8	66.0	75.0	66.9	60.4	47.4	38.7	30.4	47.8	Peter Bowman.
Sidney	S. W. S.	23.8	34.4	37.0	51.2	67.6	73.7	79.9	69.9	65.2	48.4	39.5	30.1	51.7	Ed. Pence.
State University	S. W. S.	25.4	35.6	36.1	48.2	66.3	70.7	75.5	70.8	64.4	47.9	37.6	30.7	50.8	Moses Craig.
Tiffin	V. O.	21.2	30.2	33.0	47.3	63.4	70.3	77.7	68.6	62.2	.....	.....	.....	.....	R. J. Thompson.
Do	V. O.	23.7	32.2	32.9	48.7	66.6	72.2	80.7	71.1	62.4	47.8	37.8	30.0	50.5	Rev. T. H. Sonedecker.
Upper Sandusky	S. W. S.	24.8	33.8	35.2	50.0	66.1	72.9	79.4	70.9	63.8	49.3	39.3	30.9	51.4	Dr. A. Billhardt.
Washington Court-House	S. W. S.	27.1	37.1	37.9	51.1	67.0	71.9	.....	.....	65.7	50.8	.....	.....	.....	R. H. Morrow.
Wauseon	V. O.	19.3	28.3	31.5	46.2	63.2	69.2	77.1	68.8	61.6	46.5	37.1	26.9	48.0	Thomas Mikesell.
Waverly	S. W. S.	29.0	40.3	39.2	51.3	66.2	70.9	77.9	.....	65.7	.....	38.6	32.7	.....	H. W. Overman.
Westerville	V. O.	27.4	34.6	35.5	48.7	65.0	70.3	.....	.....	.....	47.6	37.7	32.2	.....	Prof. John Haywood.
West Milton	V. O.	26.7	36.0	40.0	61.0	67.0	74.0	85.0	70.0	64.0	53.1	42.1	32.0	54.2	Luke S. Mott.
Wooster	S. W. S.	.....	.....	.....	.....	.....	68.8	77.2	69.1	61.2	47.2	36.6	29.4	.....	Dr. O. N. Stoddard.
Yellow Springs	V. O.	26.2	35.0	37.4	50.5	65.8	70.7	77.8	70.7	64.5	50.8	39.3	30.9	51.6	Charles W. Rice.
Youngstown	S. W. S.	26.1	33.8	38.2	47.9	65.1	69.9	76.9	68.5	60.6	49.0	39.7	31.9	50.2	A. G. Frost.
Oregon:															
Albany	V. O.	43.8	32.7	49.7	51.0	58.7	61.5	66.9	65.0	60.2	52.8	43.6	42.2	52.3	John Briggs.
Bandon	V. O.	43.6	38.8	47.9	48.9	53.0	54.1	54.6	56.1	51.6	50.5	57.6	45.0	49.3	George Bennett.
Eola	V. O.	41.0	31.0	46.2	47.4	55.8	58.1	63.6	62.9	58.3	52.9	43.2	40.2	50.0	Thomas Pearce.
Klamath, Fort	M. P.	30.7	22.9	38.6	40.9	51.7	57.0	86.2	61.4	54.9	46.2	34.9	27.4	46.1	United States Post Hospital.
Mount Angel	V. O.	43.0	34.5	48.0	49.3	56.0	61.5	67.7	66.0	60.5	52.0	.....	.....	.....	Rev. F. Barnabas Held.
Pennsylvania:															
Altoona	V. O.	33.1	39.6	38.1	56.0	68.7	71.7	81.0	70.9	62.1	52.5	44.9	35.8	54.4	Charles B. Dudley.
Bethlehem	V. O.	26.7	33.2	33.6	49.0	67.9	71.8	79.2	71.5	60.4	52.0	40.0	.....	.....	Lerch & Rice.
Blooming Grove	V. O.	23.1	28.9	28.7	42.9	65.2	68.2	75.6	66.8	58.8	47.1	37.4	29.1	47.6	John Grathwohl.
Catawissa	V. O.	24.4	31.2	.....	.....	63.2	67.8	75.8	.....	58.8	48.8	43.2	33.2	.....	W. G. Yetter.
Corry	V. O.	20.5	29.0	27.3	43.2	62.4	64.3	73.7	65.5	57.1	45.7	36.7	27.9	46.1	William Loveland.
Drifton	V. O.	21.9	27.9	27.6	42.2	61.8	65.0	72.0	64.1	56.2	46.9	36.6	28.5	45.9	H. D. Miller.
Dyberry	V. O.	19.8	25.9	25.7	38.3	61.3	66.1	72.6	64.5	54.7	46.2	35.0	26.1	44.7	Theodore Day.
Fallsington	V. O.	27.3	33.7	34.9	47.4	63.4	68.5	76.2	69.0	60.2	50.9	.....	.....	.....	Milnor Gillingham.
Franklin	V. O.	21.1	29.5	33.6	42.4	61.3	65.2	73.0	63.0	55.0	.....	35.7	28.7	.....	Joseph Bell.
Grampian Hills	V. O.	22.1	30.3	29.5	44.0	65.1	68.4	76.8	65.6	59.0	45.4	35.8	28.0	47.5	Nathan Moore.
Meadville	V. O.	25.0	33.0	33.0	.....	.....	76.0	.....	72.0	66.0	52.4	.....	33.7	.....	J. H. Montgomery.
Philipsburg	V. O.	21.8	32.1	31.8	44.4	65.5	68.5	75.0	65.3	55.0	43.3	32.7	29.8	47.1	L. Ray Morgan.
Quakertown	V. O.	27.6	30.6	30.4	43.1	62.0	65.6	71.8	66.0	58.4	49.1	38.7	29.8	47.8	J. L. Heacock.
Reading	V. O.	.....	.....	.....	.....	.....	.....	79.6	72.4	61.4	53.0	41.5	33.0	.....	C. M. Dechant.
State College	V. O.	24.6	30.8	30.6	45.9	64.9	68.2	76.2	67.6	59.4	48.5	38.4	29.7	48.7	William Frear.
Wellsborough	V. O.	24.2	29.8	30.7	40.9	63.1	66.6	74.7	63.2	56.1	45.3	37.2	30.7	46.9	Hiram D. Deming.
Wilkes Barre	V. O.	25.6	30.7	31.4	44.9	.....	69.0	75.3	67.4	58.8	.....	38.8	31.0	.....	Rev. F. B. Hodge.
West Chester	V. O.	28.1	33.3	33.3	47.2	64.4	69.1	77.1	69.9	61.3	52.0	41.1	32.7	50.8	Dr. Jesse C. Green.
Wysox	V. O.	23.5	29.3	31.8	49.1	65.0	68.0	.....	.....	.....	.....	.....	.....	.....	Charles Beecher.
Rhode Island:															
Bristol	N. E. M. S.	27.1	30.1	31.8	42.8	56.1	62.5	72.7	68.7	59.8	51.1	41.0	33.0	48.1	N. G. Herreshoff.

Table of monthly and annual mean temperature for 1887—*Voluntary—State weather service—Military posts and Central and Southern Pacific Railroad stations*—Continued.

States and stations.	Character of stations.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Annual.	Authority.
Rhode Island—Continued.															
Newport	N. E. M. S.	28.7	31.0	33.4	44.3	57.3	62.4	71.9	67.9	61.1	53.5	43.3	35.4	49.2	T. Dunn.
Olneyville	N. E. M. S.	25.1	29.6	33.0	47.3	52.4	67.6	76.9	66.6	59.4	53.6	43.1	33.1	49.8	C. H. Cannon.
Providence	N. E. M. S.	26.5	30.2	.....	44.9	61.4	.....	76.1	.....	.....	.....	41.1	32.5	.....	City Engineer's Office.
Do	N. E. M. S.	24.1	28.8	30.8	44.3	60.1	65.5	.....	.....	59.2	50.6	40.0	30.6	.....	D. W. Hoyt.
Woonsocket	N. E. M. S.	22.1	27.9	29.9	.....	66.8	68.2	75.5	67.2	59.0	49.7	38.8	30.1	.....	A. Wagner.
South Carolina:															
Abbeville	S. W. S.	39.1	51.2	50.1	61.7	72.3	77.5	81.0	[h]76.2	71.3	59.9	50.6	[f]44.1	61.2	J. C. Klugh.
Aiken	V. O.	43.9	56.0	54.2	64.6	74.4	79.5	.....	.....	.....	[h]60.9	53.6	49.5	.....	Dr. W. H. Geddings.
Anderson	S. W. S.	40.0	51.7	51.6	64.0	73.5	76.2	82.2	76.0	.....	.....	.....	.....	.....	D. Kemper.
Belfast	S. W. S.	.....	.....	55.0	65.2	76.2	82.0	83.9	80.2	75.1	62.6	52.5	48.4	.....	Pinckney Brown.
Bennettsville	S. W. S.	.....	51.6	51.8	62.9	72.4	78.5	83.9	78.2	.....	.....	.....	.....	.....	J. H. Wells.
Blackville	S. W. S.	.....	.....	.....	.....	[d]71.4	79.5	82.0	80.1	72.5	61.6	53.0	46.0	.....	S. S. Turner.
Brewer's Mines	S. W. S.	.....	.....	[k]49.0	61.6	70.9	77.0	83.0	74.9	70.9	59.1	50.6	44.4	.....	N. Neilson.
Cheraw	S. W. S.	37.6	53.1	51.2	.....	72.1	77.8	83.7	77.4	71.0	62.6	50.0	43.3	.....	W. R. Godfrey.
Florence	S. W. S.	.....	54.6	51.2	61.7	74.2	79.0	84.3	78.4	72.7	60.7	51.3	.....	.....	Prof. H. Walshe.
Hardeeville	S. W. S.	.....	.....	.....	.....	74.0	78.4	[d]83.3	82.0	74.7	65.4	54.7	50.5	.....	W. J. Evans.
Holland's Store	S. W. S.	38.4	51.1	.....	64.3	71.6	75.9	80.3	.....	.....	.....	.....	.....	.....	J. W. Earle.
Kirkwood	V. O.	39.8	51.6	50.9	59.9	70.3	76.4	81.6	75.3	65.2	55.9	45.0	40.1	59.3	Colin Macrae.
Marion	S. W. S.	41.9	54.9	51.6	60.6	71.4	78.1	79.9	75.2	71.9	59.5	[e]50.0	46.7	61.8	S. H. Price and B. G. Gregg.
Newberry	S. W. S.	.....	.....	50.9	60.5	73.7	78.5	81.9	77.8	77.0	62.2	53.3	44.7	.....	W. G. Peterson.
Spartanburg	V. O.	37.3	48.7	48.3	59.2	70.9	72.8	88.8	74.2	70.2	62.0	53.3	42.3	60.7	John F. Bayerly.
Stateeburg	V. O.	42.4	54.1	51.9	61.4	70.9	76.2	79.3	75.6	71.3	60.6	52.0	45.3	61.8	W. W. Anderson, M. D.
Winnsborough	S. W. S.	.....	.....	50.2	62.5	71.6	77.8	81.7	75.9	71.3	59.8	51.2	44.2	.....	James Pagan.
Yemassee	S. W. S.	.....	.....	.....	.....	72.9	78.2	82.8	90.6	75.0	66.3	58.0	.....	.....	M. Wingard.
Tennessee:															
Andersonville	S. W. S.	35.6	49.9	47.4	57.7	68.4	72.0	.....	74.7	68.9	54.6	47.6	38.5	.....	J. K. Wallace.
Ashwood	V. O.	35.5	47.5	50.0	59.3	70.5	75.0	83.5	76.5	72.8	55.5	43.0	34.5	58.6	C. F. Williams.
Austin	V. O.	38.8	50.6	49.2	59.1	79.2	77.1	83.7	81.7	77.4	54.0	47.1	38.5	61.4	P. B. Calhoun.
Beach Grove	S. W. S.	38.5	50.9	48.0	.....	70.0	73.3	78.2	75.9	.....	55.5	47.2	39.7	.....	A. B. Robertson.
Careyville	S. W. S.	36.0	48.5	46.1	57.7	68.4	68.6	.....	72.5	66.8	53.7	.....	.....	.....	David Hart, M. D.
Cookeville	S. W. S.	35.3	45.7	46.3	57.8	68.7	72.5	78.0	77.6	67.9	55.9	43.4	38.5	57.3	H. C. Taylor, Rutledge Smith.
Covington	S. W. S.	38.5	49.2	54.1	63.4	70.9	74.8	79.3	78.1	73.1	58.2	49.1	40.0	60.7	James I. Hall.
Farmingdale	S. W. S.	34.6	.....	45.6	54.6	65.3	68.5	74.7	72.2	.....	.....	.....	.....	.....	Lewis Boynton.
Fayetteville	S. W. S.	.....	52.4	50.3	59.3	69.0	72.4	79.3	79.3	73.3	55.6	47.7	40.8	.....	John C. Diemer.
Florence Station	S. W. S.	39.0	50.4	49.3	60.6	71.7	75.8	80.9	79.2	71.9	56.7	47.7	39.6	60.2	C. F. Vanderford.
Fostoria	S. W. S.	35.6	48.4	45.5	56.0	64.0	67.1	72.0	71.0	64.7	55.8	45.9	37.6	55.3	Charles Foster.
Greenville	S. W. S.	35.0	50.4	48.4	56.7	69.9	73.2	79.6	75.8	69.5	54.7	46.2	38.5	58.0	H. W. Farnsworth, W. H. Brown.
Grief	S. W. S.	36.4	50.0	47.0	57.2	68.5	72.6	76.8	73.7	.....	53.2	44.7	38.5	.....	J. T. Cowden.
Hohenwald	S. W. S.	37.8	50.0	49.3	59.3	69.8	74.3	80.2	77.7	71.7	54.2	48.0	39.0	59.3	R. Downey.

McKenzie	S. W. S.	35.6	47.3	49.4	60.9	71.5	77.3	79.1	.....	73.7	57.9	.....	.....	.....	C. Hawkins.
Manchester	S. W. S.	35.1	47.4	45.8	54.6	67.1	70.0	.....	.....	.....	.....	.....	.....	.....	Wiley Hickerson.
Milan	V. O.	37.3	48.0	50.2	60.8	71.4	75.0	86.7	78.0	71.0	56.0	46.0	38.4	59.9	Dr. M. D. L. Jordan.
Parksville	S. W. S.	38.9	51.1	48.7	59.6	.....	72.1	76.7	74.8	68.7	.....	48.9	41.0	.....	J. C. Williamson.
Riddleton	S. W. S.	37.6	49.2	47.9	58.7	70.4	70.6	80.1	78.1	71.2	56.4	46.5	38.6	58.8	S. P. Fergusson.
Rogersville	S. W. S.	33.1	47.7	45.9	56.1	68.5	68.0	73.1	73.5	66.8	56.2	43.6	39.4	56.0	S. M. Miller, M. D.
Savannah	S. W. S.	40.6	51.1	51.3	61.8	71.0	74.4	80.0	75.0	.....	.....	46.8	40.0	.....	H. R. Hinckle.
Trenton	S. W. S.	36.0	46.8	49.1	58.4	69.8	72.7	79.1	76.7	69.6	54.4	44.5	37.7	57.9	A. S. Currey.
Waverly	S. W. S.	35.5	47.5	47.3	57.8	69.5	73.2	78.8	75.3	68.6	53.1	46.5	39.0	57.7	Levi McCallum, R. T. Shannon.
Waynesborough	S. W. S.	40.7	53.0	50.8	60.6	71.6	75.4	78.8	76.4	70.9	59.5	48.7	39.7	58.8	C. Buchanan, M. D.
Texas:															
Austin	V. O.	48.8	57.1	63.2	70.4	76.0	79.2	87.4	86.4	73.8	68.2	56.4	.....	.....	Oscar Samostz.
Cleburne	V. O.	38.0	48.0	57.2	65.0	74.0	78.8	86.0	74.3	73.2	61.0	49.3	40.4	62.1	Dr. T. C. Osborn.
Concho, Fort	M. P.	43.5	50.4	60.0	67.8	74.6	81.1	86.5	83.6	76.7	62.6	52.8	43.2	65.2	U. S. Post Hospital.
El Paso	R. R.	40.5	50.4	63.6	68.9	84.4	91.3	89.7	86.3	85.4	63.3	54.2	40.3	68.2	Pacific Railway system.
McIntosh, Fort	M. P.	53.4	64.4	66.7	75.5	81.8	84.6	88.5	87.3	80.4	69.4	62.1	51.3	72.1	U. S. Post Hospital.
Midland	V. O.	41.7	45.8	51.8	64.6	.....	79.4	84.1	80.7	74.6	59.0	49.4	37.5	.....	J. C. Rathburn.
New Ulm	V. O.	49.6	59.2	60.7	68.9	75.1	79.2	83.3	82.4	74.8	67.0	59.8	49.3	67.4	C. Runge.
Ringgold, Fort	M. P.	58.4	67.4	71.8	76.3	81.4	82.2	85.0	86.9	80.0	70.1	65.1	53.5	73.2	U. S. Post Hospital.
Silver Falls	V. O.	45.1	45.8	56.7	62.6	68.6	77.5	74.6	81.4	73.1	59.7	51.8	38.6	61.3	C. M. Tilford.
Utah:															
Blue Creek	R. R.	34.2	33.7	47.1	53.0	72.1	78.9	85.0	79.6	67.2	53.5	41.3	28.8	56.2	Pacific Railway system.
Corinne	R. R.	31.6	31.4	46.1	50.8	65.8	73.9	81.3	77.3	67.4	51.0	37.2	25.8	53.3	Do.
Kelton	R. R.	34.4	31.0	44.0	49.3	63.6	72.9	77.7	71.5	60.9	49.2	33.5	24.0	51.0	Do.
Ogden	R. R.	34.0	36.2	47.0	51.9	67.1	73.5	80.3	78.5	65.5	51.1	38.2	27.9	54.3	Do.
Promontory	R. R.	28.6	26.8	41.2	43.4	57.7	69.2	77.7	74.4	63.8	51.8	34.0	22.9	49.3	Do.
Terrace	R. R.	31.0	23.7	47.8	51.3	.....	78.5	86.1	79.4	71.3	67.1	43.8	23.1	.....	Do.
Vermont:															
Brattleborough	V. O.	18.5	23.3	27.8	42.2	62.1	65.2	74.6	64.7	56.3	46.3	35.5	25.1	45.1	W. H. Childs.
Do	N. E. M. S.	18.4	23.0	27.6	40.5	61.9	64.3	.....	.....	55.8	47.2	35.6	25.9	.....	H. B. Chamberlain.
Burlington	V. O.	18.1	[1]18.7	26.4	41.1	64.9	67.3	.....	.....	[h]55.9	47.7	35.4	22.9	.....	W. B. Gates.
Charlotte	V. O.	14.2	18.2	24.3	39.0	65.0	[h]65.9	74.2	.....	.....	46.2	35.8	22.0	.....	Miss M. E. Wing.
Chelsea	N. E. M. S.	10.8	14.3	19.5	35.0	56.9	59.8	66.1	58.1	50.0	42.5	32.1	21.6	38.9	H. L. Bixley.
Guilford Centre	N. E. M. S.	.....	.....	.....	.....	57.7	.....	72.5	.....	55.3	45.3	35.2	25.0	.....	J. C. Cutting.
Jacksonville	N. E. M. S.	17.4	21.5	25.5	37.5	59.3	63.7	72.4	63.1	53.4	43.4	33.7	24.2	42.9	J. W. Hatch.
Lunenburgh	V. O.	13.3	15.1	22.0	35.9	59.4	64.8	74.2	64.9	58.0	43.6	32.5	22.1	42.2	H. A. Cutting.
Marlborough	W. S.	16.7	18.4	23.3	36.9	60.1	64.0	71.9	63.5	54.1	43.9	33.1	23.9	42.5	C. A. Amea.
Newport	V. O.	11.3	15.0	21.1	36.2	61.6	66.0	73.7	64.3	55.4	45.4	33.2	20.7	42.0	Rev. E. P. Wild.
Strafford	V. O.	12.9	17.5	22.3	37.6	63.0	66.2	73.5	65.8	56.5	45.9	32.8	22.2	43.0	N. F. J. Scribner.
Townshend	N. E. M. S.	.....	22.9	27.4	39.8	63.3	66.1	73.5	64.8	55.2	46.0	34.4	.....	.....	R. Sanderson.
Vernon	N. E. M. S.	17.3	23.4	27.1	39.5	62.7	67.0	75.7	67.1	57.5	48.5	36.8	26.0	45.7	A. Whitehead.
Windsor	N. E. M. S.	15.2	20.7	.....	37.7	61.0	64.8	74.0	.....	.....	.....	.....	.....	.....	
Woodstock	N. E. M. S.	.....	.....	.....	.....	.....	65.4	74.3	63.4	.....	43.6	32.6	22.6	.....	Mrs. E. J. Doton.
Virginia:															
Bird's Nest	V. O.	38.9	44.4	42.8	52.7	68.8	70.4	84.0	76.1	69.1	61.3	47.8	41.2	58.1	C. R. Moore.
Dale Enterprise	V. O.	33.6	42.0	42.0	54.3	72.0	76.9	83.0	76.2	68.3	56.9	47.4	36.2	57.3	L. J. Heatwole.
Marion	V. O.	32.5	44.0	39.5	49.0	66.0	68.0	76.0	69.5	[d]62.0	49.0	39.7	37.0	52.7	A. T. Lincoln.
Monroe, Fort	M. P.	38.3	44.5	43.8	52.9	67.8	73.2	81.8	75.8	69.9	60.8	48.4	41.4	58.2	U. S. Post Hospital.
Rappahannock	V. O.	30.7	36.1	40.6	50.1	72.1	69.2	88.5	80.9	75.7	59.8	44.8	38.6	57.3	W. H. Ireland.
Snowville	V. O.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Summit	V. O.	32.1	40.0	39.0	50.2	67.5	70.1	79.2	72.5	64.2	53.2	42.4	33.6	53.7	John R. Sim.
University of Virginia	V. O.	39.0	47.2	44.5	53.1	71.0	72.7	74.9	73.2	62.8	56.8	48.5	35.8	56.6	James Wearmouth.

Table of monthly and annual mean temperature for 1887—*Voluntary—State weather service—Military posts and Central and Southern Pacific Railroad stations*—Continued.

States and stations.	Character of stations.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Annual.	Authority.
Virginia—Continued.															
Variety Mills	V. O.	32.9	40.6	40.6	51.2	66.4	69.8	77.5	71.0	63.3	52.0	42.2	34.9	53.5	J. H. Micklem.
Wytheville	V. O.	33.5	40.0	40.8	52.0	65.3	68.2	75.6	68.8	63.1	57.2	43.7	35.3	53.6	Howard Shriver.
Washington Territory:															
Bainbridge Island	M. P.	42.5	32.7	46.8	49.5	56.2	59.5	62.0	61.2	57.2	50.0	43.0	42.0	50.2	R. M. Hoskinson.
Spokane, Fort	V. O.	29.3	18.2	42.3	48.4	58.4	62.0	70.6	69.5	57.5	46.0	33.9	31.9	47.3	U. S. Post Hospital.
Tacoma	V. O.	39.8	30.1	45.2	47.1	53.9	58.9	63.4	60.5	57.9	50.3	42.3	40.8	49.2	Edwin N. Fuller.
Townsend, Fort	M. P.	41.2	31.7	45.8	47.9	45.4	58.7	61.5	61.1	56.3	50.2	44.8	42.6	48.9	U. S. Post Hospital.
Vashon	V. O.	.....	.....	.....	.....	.....	.....	60.3	59.5	55.4	49.2	44.0	38.0	.....	Ford A. Carpenter.
Walla Walla, Fort	M. P.	41.5	24.1	49.4	52.7	59.7	65.6	79.0	69.8	62.1	51.0	39.6	38.7	52.8	U. S. Post Hospital.
West Virginia:															
Clarksburgh	V. O.	29.4	41.7	37.6	51.4	70.8	75.3	80.0	73.6	73.0	50.3	41.0	33.0	54.8	A. D. Lowndes.
Helvetia	V. O.	31.0	42.0	37.4	47.7	63.2	65.8	73.8	66.8	60.3	48.9	40.7	35.1	51.1	Dr. C. F. Stucky.
Middlebrook	V. O.	25.6	35.5	31.4	43.0	60.6	63.4	70.0	63.8	55.8	44.6	36.9	29.0	46.6	S. F. H. Hewit.
Parkersburgh	V. O.	30.9	39.1	39.0	50.1	66.9	70.4	84.6	71.6	65.6	52.0	40.9	38.5	54.1	T. G. Field.
Wisconsin:															
Beloit	V. O.	12.0	21.5	29.0	47.7	62.4	70.4	75.9	69.3	159.5	44.5	32.8	22.7	45.6	Beloit College Observatory.
Delavan	V. O.	11.6	21.4	26.8	41.2	64.0	70.1	74.7	68.6	56.9	42.6	31.8	22.1	44.3	George S. Collie.
Embarrass	V. O.	2.0	15.4	25.7	43.9	65.2	69.5	74.3	66.4	59.2	43.8	32.9	23.8	43.5	J. E. Breed.
Fond du Lac	V. O.	8.9	18.9	29.1	44.0	63.0	67.6	73.4	66.3	47.3	43.1	31.6	23.2	43.0	J. C. Wedge.
Lancaster	V. O.	5.8	.....	.....	47.6	.....	71.3	61.8	69.2	59.6	44.6	32.0	18.6	.....	Edw. Pollock.
Madison	V. O.	10.0	19.1	28.0	46.3	63.8	70.0	74.7	68.2	59.2	44.1	34.2	22.3	45.0	Washburne Observatory.
Manitowoc	V. O.	13.8	21.6	27.8	42.8	59.1	64.4	72.0	65.7	58.6	44.8	35.5	27.6	44.5	Clasina Lüps.
Prairie du Chien	V. O.	10.2	19.4	31.2	49.0	66.2	72.8	76.9	69.6	60.0	44.8	34.0	22.5	46.4	College of Sacred Heart.
Wausau	V. O.	5.0	13.8	24.7	41.3	61.7	66.7	.....	.....	.....	.....	.....	.....	.....	A. C. Clark.
Wyoming:															
Laramie, Fort	M. P.	24.4	20.6	42.4	46.4	63.0	71.0	73.8	68.3	59.4	44.8	35.3	24.1	47.8	U. S. Post Hospital.
McKinney, Fort	M. P.	20.5	16.4	41.2	43.7	54.1	62.6	70.7	68.4	61.4	42.4	36.2	22.7	45.0	Do.
Sheridan, Camp	M. P.	18.3	16.5	34.6	36.9	47.0	56.2	61.1	58.3	53.0	39.1	31.0	19.2	39.3	Do.
Washakie, Fort	M. P.	22.0	22.8	41.0	45.6	56.4	68.9	72.0	66.2	59.8	41.9	34.3	21.7	46.0	Do.

APPENDIX No. 21.

Mean maximum and mean minimum temperature (in degrees Fahrenheit) at stations of the Signal Service, for each month of the year 1887.

[The monthly means are obtained by dividing the sum of the daily readings by the number of days in the month. To obtain the mean daily range of temperature, subtract the mean minimum from the mean maximum.]

Stations.	January.		February.		March.		April.		May.		June.		July.		August.		September.		October.		November.		December.	
	Max	Min.	Max	Min.	Max	Min.	Max	Min.	Max	Min.	Max	Min.	Max	Min.	Max	Min.	Max	Min.	Max	Min.	Max	Min.	Max	Min.
Alabama:																								
Mobile	56.6	38.6	69.5	56.2	68.7	49.4	76.3	55.9	84.5	65.9	86.7	68.8	90.1	72.7	89.2	72.4	85.7	68.8	75.0	57.6	68.6	48.5	57.8	43.1
Montgomery	54.4	36.4	67.5	52.7	68.7	47.5	77.9	54.4	86.6	66.5	91.0	71.0	90.7	72.8	90.4	71.4	85.8	65.4	73.1	54.4	67.4	44.8	54.6	39.5
Alaska:																								
Hoochnahoo	22.0	16.0	25.0	15.0	31.7	23.1	44.4	32.8	51.0	38.1	58.0	43.0	60.0	46.0	59.0	46.0	55.0	40.0	47.0	36.0	39.0	32.0	29.0	23.0
Pyramid Harbor	18.0	5.0	22.0	8.0	18.0	−0.3	46.0	29.0	54.0	34.0	64.0	43.0	62.0	43.0	61.0	47.0	57.0	41.0	45.0	34.0	36.0	26.0	22.0	11.0
Sitka[1]	35.9	23.0	33.1	18.1	39.5	27.5	46.1	32.4	50.8	37.6	56.8	43.5	57.5	47.3	60.6	48.6	57.0	45.4	.....	.....	.....	.....	.....	.....
Arizona:																								
Apache, Fort	56.1	19.4	55.4	27.0	69.8	29.0	69.6	34.2	80.5	41.8	92.0	50.8	89.8	57.6	87.3	57.8	81.1	53.8	73.1	37.9	64.2	29.6	48.9	21.2
Bowie, Fort	55.4	36.2	55.0	36.8	68.8	45.0	70.3	48.1	80.9	57.6	91.5	66.1	88.4	67.8	85.4	67.8	79.0	62.7	71.1	51.6	61.9	41.6	47.1	29.9
Grant, Fort	59.1	35.4	56.2	36.2	69.7	47.6	68.1	45.9	77.8	56.0	88.9	64.9	88.5	65.2	86.4	65.4	81.6	61.4	73.6	51.7	64.7	43.3	50.8	29.1
Maricopa[2]	68.6	34.1	67.9	37.2	86.7	45.6	84.5	51.9	95.0	61.2	106.3	70.6	104.2	77.4	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
McDowell, Fort	66.6	28.7	65.7	36.2	83.6	43.0	84.0	48.1	97.0	55.0	107.8	65.1	108.4	74.2	106.1	71.4	96.9	71.9	86.9	52.8	74.2	41.8	57.6	29.8
Phœnix[3]	68.9	34.5	70.6	37.0	90.6	47.8	88.0	51.2	99.6	58.2	106.7	67.7	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
San Carlos Agency	61.2	23.4	62.0	32.2	79.7	39.5	80.9	44.3	91.6	53.7	103.9	63.7	101.6	70.3	97.3	70.8	91.6	57.5	83.2	48.6	.....	.....	52.1	28.8
Thomas, Fort	60.3	24.4	62.4	32.4	77.7	37.7	78.8	43.0	93.4	53.6	101.2	66.0	101.1	69.8	96.7	70.5	89.1	63.6	80.8	46.7	65.2	34.1	52.0	27.0
Verde, Fort	58.8	21.3	60.4	31.6	76.8	37.1	74.1	42.8	85.1	48.3	96.3	56.8	97.6	63.2	95.2	64.4	90.6	55.2	80.3	43.1	70.9	28.2	53.6	23.8
Whipple Barracks	53.6	23.5	49.0	26.4	66.8	31.7	63.6	36.0	75.6	41.9	85.4	50.7	86.5	58.5	84.9	57.9	78.4	53.2	69.3	39.0	60.9	31.1	43.8	21.0
Wilcox	64.4	17.2	61.8	28.2	79.3	28.6	77.4	32.7	85.9	42.3	96.0	53.2	93.3	63.3	92.6	63.0	86.3	56.9	80.6	41.6	70.9	28.5	54.8	21.0
Yuma	68.2	42.4	67.2	43.4	85.0	53.3	84.4	55.0	92.1	59.5	101.6	69.4	106.2	75.7	104.9	74.3	99.1	69.8	90.2	60.8	78.5	50.0	64.8	41.3
Arkansas:																								
Fort Smith	49.3	25.6	55.1	35.7	66.4	41.7	76.4	50.3	81.8	59.3	86.8	65.6	93.8	69.9	89.2	69.0	81.6	64.2	71.7	49.8	63.2	37.1	47.1	30.9
Little Rock	50.7	31.2	58.2	38.8	66.0	44.5	75.8	50.1	82.0	62.4	86.1	67.0	91.8	71.6	89.7	70.2	85.0	65.8	73.2	51.5	63.5	39.5	47.6	33.9
California:																								
Bidwell, Fort	41.3	22.5	33.5	14.2	55.2	31.8	56.1	31.7	67.0	40.7	72.1	43.3	83.4	51.0	81.0	48.9	75.4	42.8	67.6	34.0	52.3	24.7	40.4	20.0
Eureka	52.8	40.5	48.4	33.7	56.3	42.5	54.1	42.9	58.2	46.3	58.0	46.9	57.0	48.0	58.6	50.8	59.3	48.6	59.1	46.8	56.8	44.2	53.8	41.6
Keeler	54.3	32.2	48.6	31.2	69.1	44.4	68.0	46.8	78.2	54.2	86.3	61.2	92.8	68.7	91.8	64.9	84.4	59.1	74.8	51.6	60.9	41.5	52.1	33.6
Los Angeles	67.7	42.6	60.4	42.2	72.6	46.4	70.8	49.6	77.8	51.3	81.1	54.4	84.3	59.0	82.7	57.6	81.6	57.2	79.5	53.0	71.8	48.5	63.7	42.6
Red Bluff	57.1	39.8	50.0	35.5	69.7	46.1	71.6	47.7	81.6	54.3	89.7	62.3	97.3	66.0	94.8	64.6	90.0	60.2	83.7	57.2	66.6	43.1	55.6	40.2
Sacramento	57.7	39.3	52.2	37.4	69.4	46.9	69.5	48.9	75.9	50.5	84.4	55.1	88.3	54.3	86.6	53.6	86.3	55.3	81.2	51.6	67.5	41.6	55.6	37.6
San Diego	62.6	44.8	59.9	45.4	65.3	49.5	65.4	52.9	68.2	56.2	70.1	59.5	71.6	62.3	70.9	62.1	70.9	61.4	71.9	57.7	66.4	51.5	62.2	46.7
San Francisco	58.7	46.4	53.4	42.2	64.0	47.7	63.1	48.6	64.5	49.6	67.1	51.7	62.4	50.7	64.6	51.1	70.6	53.4	73.8	54.7	63.2	49.7	58.0	46.3
Colorado:																								
Colorado Springs[4]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	80.7	54.3	79.2	53.5	74.0	49.0	61.7	34.5	54.3	24.0	41.7	14.7
Denver	44.1	17.4	46.8	16.7	60.0	31.9	60.3	36.3	73.5	45.0	83.4	54.6	82.8	56.6	83.0	54.5	77.1	49.5	62.4	34.2	56.0	25.8	44.0	16.7
Las Animas	45.5	10.3	51.0	15.4	64.0	27.1	67.1	37.7	77.7	49.6	87.1	59.4	91.2	61.6	88.6	60.7	81.5	53.0	67.9	37.3	57.3	21.8	42.0	14.3

[1] Closed September 30, 1887. [2] Discontinued July 21, 1887. [3] Discontinued July 26, 1887. [4] Observations began July 1, 1887.

Mean maximum and mean minimum temperature (in degrees Fahrenheit), etc.—Continued.

Stations.	January.		February.		March.		April.		May.		June.		July.		August.		September.		October.		November.		December.	
	Max	Min.	Max	Min.	Max	Min.	Max	Min.	Max	Min.	Max	Min.	Max	Min.	Max	Min.	Max.	Min.	Max	Min.	Max	Min.	Max	Min.
Colorado—Continued.																								
Montrose	39.4	14.7	45.5	22.1	59.1	28.7	60.1	33.5	74.2	43.1	85.0	52.9	84.8	56.0	82.1	52.8	74.9	48.5	62.5	35.4	51.7	25.7	33.3	8.6
Pike's Peak	5.8	— 6.1	11.0	—2.3	19.0	9.8	22.0	8.6	33.7	20.3	44.0	29.8	46.5	33.8	47.0	32.2	41.2	28.4	31.1	17.6	25.9	12.8	11.6	— 4.8
Connecticut:																								
New Haven	33.7	15.9	37.7	22.3	43.9	23.6	53.8	35.5	70.5	51.2	74.4	56.1	82.6	68.0	76.4	60.5	67.8	51.0	59.5	43.0	49.4	31.5	39.6	25.4
New London	36.3	19.9	39.3	24.5	42.0	26.0	53.8	36.7	67.2	50.6	71.8	55.9	79.7	67.5	75.8	61.9	68.6	53.7	60.4	45.4	51.2	33.7	41.5	27.8
Dakota:																								
Bismarck	9.3	—18.6	8.1	—13.3	38.0	15.7	56.3	32.5	74.6	46.5	82.1	56.0	82.9	57.8	76.0	54.3	69.7	45.5	52.9	29.6	41.9	14.4	20.1	— 2.5
Buford, Fort	8.0	—16.1	4.2	—17.6	38.5	16.9	55.4	31.6	71.9	45.4	78.3	54.3	80.9	55.4	75.7	55.1	71.9	46.1	53.0	28.5	38.9	14.3	19.8	— 1.3
Deadwood	29.0	11.2	27.4	4.5	47.9	27.6	50.6	33.5	64.7	44.6	74.0	52.7	76.5	55.3	71.1	52.4	68.3	46.9	52.7	31.3	43.6	24.9	32.4	14.0
Huron	12.9	—12.8	14.4	7.2	42.5	21.1	60.5	35.1	76.8	47.6	81.5	58.1	84.5	59.4	76.5	56.2	73.0	48.7	55.9	29.9	45.4	17.4	20.2	— 0.3
Sully, Fort	13.7	— 6.6	11.3	— 7.2	44.5	24.2	63.7	45.8	77.2	50.4	82.7	58.2	88.2	62.4	79.7	58.0	76.0	50.8	57.3	33.6	46.7	19.4	22.3	3.4
Totten, Fort	—0.2	—21.4	2.0	—15.8	29.8	8.4	48.9	27.4	69.8	45.2	77.0	54.4	75.6	56.4	71.2	51.8	66.6	43.6	47.2	27.0	35.7	13.7	13.7	— 7.5
Yankton	20.0	— 3.7	22.1	0.4	45.9	24.9	64.2	40.3	77.2	50.6	82.0	61.1	86.0	63.6	80.7	59.9	74.2	52.9	59.1	36.0	48.6	24.1	26.7	8.0
Yates, Fort	9.4	—13.7	9.1	— 9.4	39.4	17.9	59.4	33.9	73.2	46.8	84.3	70.4	87.3	59.9	80.4	55.4	74.8	47.4	57.1	27.8	46.7	17.2	20.7	1.8
Delaware:																								
Cape Henlopen[1]	42.8	33.0	47.6	36.4	44.6	31.3	53.6	39.3	66.9	53.8	74.7	59.1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
District of Columbia:																								
Washington City	41.3	23.5	47.7	31.8	46.7	30.8	61.3	42.1	78.2	58.0	81.1	61.8	89.1	71.7	82.0	64.6	74.3	56.7	64.8	46.8	53.8	36.8	43.7	29.9
Florida:																								
Cedar Keys	58.1	42.2	72.8	60.3	68.3	54.4	75.9	60.1	81.4	67.5	85.0	71.6	87.5	76.2	88.3	75.7	84.6	71.0	79.8	65.4	70.3	54.3	64.1	51.1
Jacksonville	59.8	40.9	75.3	57.0	69.9	50.5	77.3	58.2	83.0	65.2	87.1	70.4	91.3	74.3	90.1	73.5	84.2	68.9	77.7	63.5	70.4	51.3	64.3	47.0
Key West	72.2	62.1	78.5	69.7	75.3	66.7	79.2	70.4	82.1	73.2	83.9	75.0	87.7	77.6	87.3	79.7	86.0	76.3	83.1	74.5	76.3	69.3	75.7	67.5
Pensacola	55.6	41.9	63.4	58.3	68.0	52.6	75.5	59.9	83.2	69.1	85.5	72.7	89.0	75 5	88.5	74.9	84.2	71.1	75.4	60.9	68.4	52.4	59.6	47.2
Sanford[2]	66.0	45.9	77.7	60.6	73.6	52.7	79.5	60.9	83.8	65.1	87.3	70.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Titusville[3]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	89.9	72.3	88.1	73.6	82.3	72.6	80.3	69.2	73.0	57.5	69.9	55.6
Georgia:																								
Atlanta	48.5	31.1	60.6	45.2	61.5	41.2	73.1	50.3	82.3	61.9	85.8	65.9	85.6	70.0	84.8	68.2	80.6	61.8	68.3	50.6	62.3	41.9	48.9	34.5
Augusta	53.1	31.6	65.1	46.5	67.1	41.1	77.2	49.2	87.0	62.6	90.4	67.9	93.5	73.3	90.2	70.7	85.4	64.0	73.8	52.0	66.2	41.3	55.3	38.4
Savannah	54.9	37.1	68.2	51.5	67.4	46.7	74.9	54.7	82.0	65.6	86.6	69.2	90.1	73.8	88.2	72.9	82.0	66.3	73.4	58.1	66.5	46.7	58.2	43.2
Idaho:																								
Boisé City	43.7	28.4	38.5	21.6	58.8	35.0	61.3	36.8	76.7	43.8	79.6	47.7	90.1	54.2	87.1	51.0	81.3	45.0	68.4	34.4	54.7	25.3	40.1	24.6
Sherman, Fort[4]	37.2	25.0	27.7	6.2	51.6	30.4	.....	.....	66.7	41.0	67.6	44.8	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Illinois:																								
Cairo	41.3	24.9	50.4	35.3	55.5	40.4	69.2	50.2	78.8	62.5	82.7	66.5	89.2	71.9	88.2	68.2	80.4	62.8	67.1	46.1	57.4	35.6	44.7	29.1
Chicago	26.6	6.1	35.1	16.9	39.4	25.0	60.2	37.2	68.8	51.1	75.9	58.8	84.2	66.4	76.5	60.8	70.1	54.5	56.6	37.7	45.9	26.4	34.2	19.2
Springfield	34.6	12.8	45.1	25.8	50.1	31.2	66.4	43.0	77.6	57.2	83.7	62.2	91.6	68.2	85.5	63.2	76.4	56.1	61.0	40.3	52.6	30.4	35.8	20.3
Indiana:																								
Indianapolis	33.6	14.1	43.2	26.6	47.1	29.8	62.9	41.4	77.8	56.2	83.6	61.9	91.8	68.5	83.9	62.2	76.0	55.7	60.2	39.6	50.7	30.1	37.6	23.2
Terre Haute[5]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	84.9	62.9	93.5	67.9	84.8	62.5	77.0	56.8	62.9	39.7	53.7	30.2	40.0	23.4

Indian Territory:																									
Reno, Fort	51.6	19.9	55.2	30.9	69.9	41.5	74.9	51.8	82.0	58.0	87.6	64.0	98.7	68.0	92.7	67.3	79.4	61.9	71.2	45.0	63.7	34.0	43.3	22.1
Sill, Fort	51.2	24.0	54.0	31.5	69.5	40.7	76.3	49.8	82.5	61.0	88.1	68.5	97.6	71.7	92.3	69.9	82.8	64.4	69.5	48.7	62.4	36.7	47.1	27.9
Supply, Fort	47.8	19.4	50.7	24.7	67.7	33.6	73.5	45.6	83.2	60.1	88.7	65.0	95.1	74.0	88.7	69.1	82.6	62.9	72.9	41.5	65.3	29.3	51.4	28.4
Iowa:																									
Davenport	26.4	2.8	35.8	14.9	44.5	26.9	64.4	40.9	77.2	56.5	83.2	62.4	88.7	67.2	82.8	61.9	75.0	55.7	57.7	38.9	48.4	28.9	38.4	16.2
Des Moines	21.7	—0.3	29.9	9.5	45.3	27.1	64.4	40.8	78.4	53.6	83.3	61.5	89.7	65.6	83.9	61.4	74.1	54.9	60.2	38.2	47.8	25.7	31.8	14.5
Dubuque	20.9	0.4	30.0	11.0	41.1	24.2	62.0	39.0	77.4	55.0	82.8	61.6	88.3	67.2	81.6	60.3	71.5	53.5	56.5	37.1	44.8	25.9	30.7	14.8
Keokuk	29.0	9.1	39.2	21.6	48.5	31.3	66.5	41.8	76.6	57.6	83.7	63.0	90.7	69.1	85.8	63.8	77.3	57.2	61.1	40.9	51.9	31.9	35.6	19.6
Kansas:																									
Concordia	33.8	10.3	35.5	12.8	56.4	29.4	68.5	42.6	78.9	54.2	83.0	62.9	90.8	65.8	83.5	64.2	77.3	57.7	65.2	40.5	54.1	29.1	37.0	17.5
Dodge City	41.2	13.8	43.8	18.7	61.8	30.9	68.1	41.6	78.9	53.0	86.1	63.0	92.8	65.5	87.2	63.9	80.6	57.5	68.3	40.5	57.3	28.3	42.0	16.7
Leavenworth	31.3	10.5	38.5	20.6	54.3	32.9	70.0	46.0	79.8	59.1	84.0	65.0	91.8	68.0	84.6	63.9	77.5	57.8	65.4	40.8	54.4	31.3	37.4	19.2
Topeka[5]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	88.6	61.4	94.4	64.3	85.9	63.1	79.8	57.6	66.4	39.1	55.8	28.6	38.6	17.9
Kentucky:																									
Louisville	41.9	22.4	53.2	34.4	55.8	36.3	67.4	45.0	80.6	60.5	85.1	64.3	92.8	71.5	88.5	67.8	80.4	60.6	66.2	44.5	56.4	34.4	43.8	28.5
Louisiana:																									
New Orleans	60.1	41.6	73.7	59.0	72.0	54.2	77.6	60.1	84.1	67.7	86.2	72.5	90.2	74.5	89.7	75.0	84.9	71.7	76.0	62.0	70.1	53.7	59.7	46.3
Shreveport	57.6	34.1	65.8	48.2	74.3	50.1	81.8	55.9	88.3	65.6	93.3	70.9	95.4	73.8	94.0	73.3	89.8	67.5	76.2	54.3	68.6	44.8	53.3	39.5
Maine:																									
Eastport	31.4	9.9	29.6	11.8	35.2	21.1	44.5	30.3	55.3	41.0	61.9	46.4	68.7	53.1	67.4	52.5	61.5	47.6	52.3	40.4	44.6	30.5	32.1	18.4
Portland	27.0	9.3	29.7	14.7	35.2	21.6	47.3	32.3	63.9	47.5	69.2	53.4	77.0	63.2	72.3	56.9	65.4	48.8	55.1	40.7	45.0	30.0	34.5	21.2
Maryland:																									
Baltimore	40.3	25.1	46.5	32.2	45.4	31.2	61.2	41.8	76.6	58.9	81.3	63.0	88.9	73.2	82.0	66.2	73.0	57.4	64.8	48.5	53.3	37.9	43.0	30.9
Massachusetts:																									
Boston	34.4	15.7	36.5	20.9	39.1	23.9	52.4	36.1	67.6	51.8	73.4	57.0	82.0	67.1	75.0	60.5	67.7	51.9	58.9	44.2	50.8	33.8	39.2	25.6
Edgartown	39.2	21.6	38.7	22.0	40.2	25.6	50.8	37.0	63.1	48.2	67.5	55.8	80.9	68.6	74.7	66.5	67.6	56.0	59.3	46.3	50.5	35.8	41.5	29.9
Nantucket	40.2	24.8	40.2	27.3	38.8	26.5	48.8	35.1	61.7	48.2	66.7	54.4	76.1	64.6	71.7	61.6	65.2	55.4	57.9	48.3	.....	37.6	42.8	30.4
Vineyard Haven	41.5	22.9	41.3	20.8	41.5	25.6	53.5	36.1	66.2	48.3	72.3	54.5	81.6	64.8	76.8	64.3	68.9	54.9	61.6	46.3	55.5	36.8	45.9	29.3
Wood's Holl[6]	.....	.....	.....	.....	42.4	28.8	52.7	36.7	64.2	49.0	68.7	55.7	75.2	65.8	72.7	62.7	65.5	56.2	58.2	47.4	50.3	37.1	40.9	28.0
Michigan:																									
Alpena	22.5	4.2	24.8	6.7	28.6	11.0	44.7	28.4	65.7	45.6	68.4	52.9	77.3	59.7	70.3	52.3	62.9	44.0	49.5	35.0	39.5	27.7	31.2	22.0
Detroit	24.9	16.0	34.8	21.5	37.4	23.6	54.4	37.1	72.1	53.7	76.0	59.5	85.9	65.9	76.9	59.9	68.6	51.5	55.5	40.7	45.6	31.1	34.5	24.2
Escanaba	16.9	—2.1	21.9	2.1	28.7	9.4	42.2	27.4	63.6	45.9	68.9	54.4	75.7	60.1	69.9	53.0	62.7	45.5	48.0	32.9	37.1	24.6	30.4	18.4
Grand Haven	26.3	12.4	30.4	17.4	35.2	20.1	54.3	35.4	69.6	51.3	74.9	57.6	80.6	64.7	74.5	58.3	67.4	50.7	52.7	39.0	41.8	30.3	34.8	24.1
Lansing	29.2	13.5	34.5	20.8	40.1	23.9	59.0	37.3	75.5	54.5	79.3	59.7	86.6	66.3	78.3	58.8	69.2	50.7	56.1	40.5	47.0	31.7	33.0	21.6
Mackinaw City	21.5	2.4	25.1	5.1	29.1	8.6	42.8	26.5	62.2	41.2	67.2	51.5	75.8	60.4	70.6	55.4	61.7	47.7	48.7	36.2	38.3	27.2	30.8	21.3
Marquette	16.2	—0.1	20.1	2.4	28.1	10.2	45.0	27.8	68.8	47.6	69.8	50.1	75.9	56.6	69.0	52.5	62.5	45.6	47.5	33.2	37.2	23.9	28.9	19.2
Port Huron	25.8	10.2	29.7	17.1	30.9	19.5	49.9	32.6	65.9	48.4	74.0	54.8	82.5	63.5	75.0	56.1	67.1	49.1	53.4	38.3	43.6	29.2	33.4	22.5
Minnesota:																									
Duluth	12.2	—8.6	20.3	0.3	32.7	12.0	46.7	27.5	58.7	41.6	65.1	47.9	76.9	58.4	72.4	54.5	63.4	48.7	49.7	32.8	38.4	22.5	26.8	9.8
Moorhead	1.3	—21.6	7.3	—12.6	31.8	12.8	54.1	29.7	75.4	45.2	79.4	54.2	80.4	57.6	73.5	52.2	68.6	44.4	48.6	27.8	36.2	15.4	15.1	—3.5
Saint Paul	11.7	—10.3	21.0	—2.3	35.3	18.4	56.6	34.1	76.3	51.8	80.1	59.8	85.0	63.0	76.8	56.3	67.3	49.5	52.6	33.1	40.2	22.6	26.0	8.6
Saint Vincent	—2.6	—22.4	4.6	—14.7	27.1	5.0	49.7	26.5	71.8	44.2	78.3	52.4	78.3	54.9	73.8	47.8	68.5	39.6	47.1	20.7	32.5	5.4	11.9	—9.0
Mississippi:																									
University[7]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	88.4	67.2	90.1	71.9	90.6	69.4	87.1	65.4	70.9	50.5	62.1	41.7	48.2	34.6
Vicksburg	56.8	36.4	68.2	51.4	70.1	50.0	77.8	55.1	84.7	65.5	88.8	69.7	89.5	72.8	89.7	71.7	86.5	67.1	72.5	53.7	68.2	46.4	53.4	39.8
Missouri:																									
Lamar	39.9	17.2	48.8	28.0	60.1	35.9	70.9	44.4	78.4	57.7	83.0	63.2	89.2	67.5	87.1	64.3	78.3	60.1	66.5	42.1	58.2	32.5	40.5	21.9

[1] Discontinued June 18, 1887.
[2] Discontinued June 30, 1887.
[3] Observations began June 10, 1887.
[4] Discontinued June 16, 1887.
[5] Observations began June 1, 1887.
[6] Observations began March 11, 1887.
[7] Observations began June 1, 1887.

Mean maximum and mean minimum temperature (in degrees Fahrenheit), etc.—Continued.

Stations.	January.		February.		March.		April.		May.		June.		July.		August.		September.		October.		November.		December.	
	Max	Min.	Max	Min.	Max	Min.	Max	Min.	Max	Min.	Max	Min.	Max	Min.	Max	Min.	Max	Min.	Max	Min.	Max	Min.	Max	Min.
Missouri—Continued.																								
Saint Louis	41.2	20.5	50.3	31.3	55.2	37.1	70.3	51.1	78.8	63.4	85.4	68.8	92.1	75.4	87.5	70.6	79.0	61.1	65.2	43.3	56.0	34.6	39.9	23.7
Montana:																								
Assinaboine	20.4	— 5.9	6.4	—16.5	45.3	22.2	56.4	33.8	70.2	41.3	71.8	47.8	81.7	53.1	76.0	49.8	69.7	45.0	55.7	31.7	40.1	17.6	22.0	3.8
Custer, Fort	27.2	4.7	16.8	— 8.2	49.8	27.4	58.4	34.9	71.8	43.3	79.4	52.2	84.9	56.3	81.6	53.5	74.0	44.5	57.9	30.2	47.1	20.6	31.4	9.3
Helena	30.9	10.9	13.8	— 5.0	50.2	29.8	52.2	33.2	64.7	39.8	69.2	45.8	79.2	53.2	74.5	49.8	69.1	43.8	53.9	31.0	43.6	24.9	31.0	14.9
Maginnis, Fort	28.3	8.3	19.1	— 3.6	48.0	24.8	51.9	32.6	66.3	40.7	70.2	46.5	78.6	52.6	73.6	49.6	68.3	43.0	52.7	30.6	43.4	24.4	29.1	9.6
Poplar River	7.5	—18.1	2.7	—20.8	39.9	15.5	56.6	29.8	73.1	42.4	77.8	53.1	81.0	53.1	77.6	51.5	72.0	42.3	53.4	25.7	58.8	11.9	17.9	—6.1
Nebraska:																								
Crete[1]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	89.9	64.9	83.7	60.5	76.1	55.1	64.4	37.4	51.8	25.5	33.0	14.1
North Platte	31.1	8.2	32.1	8.4	53.8	27.4	64.0	37.8	77.0	48.9	81.9	59.7	87.7	62.2	82.4	59.2	75.4	52.9	61.5	33.2	52.3	21.9	34.2	11.5
Omaha	23.9	— 0.4	29.6	8.9	50.5	29.0	67.1	44.3	78.2	55.4	82.1	63.6	87.2	66.6	82.3	63.0	75.7	56.4	63.6	39.5	52.8	27.9	33.2	15.5
Valentine	28.8	1.6	26.4	— 1.4	48.8	25.7	60.1	35.4	75.2	47.1	81.0	57.2	85.0	50.7	78.8	48.5	74.0	50.3	57.8	31.5	50.3	19.0	31.4	8.3
Nevada:																								
Winnemucca	45.2	24.2	38.7	19.9	60.2	29.8	59.5	32.2	72.5	39.4	77.6	46.4	88.1	52.6	85.6	48.3	78.1	40.1	68.7	30.0	55.0	19.4	38.8	15.6
New Hampshire:																								
Manchester[3]	.....	.....	.....	.....	36.2	18.8	51.3	30.5	72.4	47.8	75.1	53.8	82.8	63.9	75.8	55.3	67.7	44.9	58.7	38.0	47.1	27.5	35.4	20.2
Mount Washington	16.6	— 7.2	17.3	— 2.6	18.1	1.1	25.7	10.6	49.0	35.6	51.8	40.8	58.1	48.0	49.7	33.8	42.2	29.8	(2)	(2)	(2)	(2)	(2)	(2)
New Jersey:																								
Atlantic City	38.2	23.9	43.9	30.9	42.9	29.1	54.1	40.0	66.2	53.9	73.5	60.3	82.8	70.2	78.5	65.7	69.8	57.4	62.8	48.8	50.8	37.4	44.7	28.8
New Mexico:																								
Lava	56.0	24.6	59.0	25.5	73.4	34.2	80.0	37.9	86.0	46.9	96.7	61.0	95.9	64.1	94.8	62.2	88.0	57.7	75.6	43.2	64.7	29.3	48.0	18.5
Santa Fé	40.9	19.0	45.0	23.1	57.7	30.2	59.6	33.9	67.5	42.5	78.3	55.5	79.9	57.6	77.8	56.4	72.0	51.9	62.4	40.4	53.3	30.8	36.1	17.9
Stanton, Fort	50.1	22.4	53.5	26.6	61.2	28.5	64.8	33.6	72.6	41.0	80.3	51.7	82.3	53.3	79.3	53.7	72.8	50.8	64.4	35.1	58.4	25.8	42.9	17.6
New York:																								
Albany	31.8	10.2	33.9	16.6	35.9	19.2	52.5	33.9	76.3	54.1	78.6	58.7	86.0	68.2	78.0	59.5	68.9	50.3	58.0	41.6	46.0	30.0	33.5	21.1
Buffalo	31.6	13.9	34.3	18.7	35.6	21.2	49.0	32.8	72.0	52.3	73.9	58.4	82.3	67.6	76.2	59.7	66.8	51.2	54.4	41.1	45.1	31.9	36.1	25.7
New York City	37.5	22.8	40.5	27.3	41.7	27.3	56.7	39.2	72.6	53.2	77.5	60.3	85.3	70.4	78.9	65.2	69.9	56.3	63.1	47.9	53.9	37.2	42.5	29.4
Oswego	29.4	10.4	31.2	15.7	33.1	18.9	48.9	32.1	68.5	49.9	70.2	54.3	80.8	65.9	73.5	58.8	66.4	50.6	55.7	40.9	44.7	30.9	34.5	22.9
Rochester	31.8	13.5	32.8	17.8	34.2	19.8	52.2	32.9	72.4	52.6	74.1	56.0	83.8	65.6	75.4	57.3	67.9	49.2	54.5	38.6	45.3	30.2	35.5	22.8
North Carolina:																								
Charlotte	47.2	29.4	58.1	40.8	59.7	37.4	71.4	48.0	81.2	61.4	86.4	64.5	91.0	70.8	85.8	66.2	81.0	59.6	67.3	48.7	61.4	39.8	50.0	34.1
Hatteras	52.1	36.8	58.8	45.5	56.3	42.8	64.5	50.4	74.1	64.1	77.1	68.7	83.7	75.0	80.8	72.2	76.3	66.2	71.4	60.4	62.4	47.7	57.1	43.1
Kitty Hawk	48.6	33.5	59.2	42.0	58.6	40.0	64.2	46.4	76.6	60.8	81.3	64.1	91.4	71.7	84.2	68.2	79.5	61.4	72.5	54.4	62.3	41.2	55.7	37.5
Raleigh	47.5	29.4	57.2	40.1	57.0	37.6	68.9	46.5	80.8	60.4	86.3	64.2	91.1	71.5	83.4	67.5	77.1	59.3	65.5	49.2	56.2	38.2	48.6	33.6
Southport	51.2	35.3	49.7	47.7	59.2	42.5	68.5	52.4	78.9	65.2	82.9	69.4	86.3	75.7	83.6	72.0	78.3	63.7	72.6	55.7	60.9	44.1	56.5	40.4
Wash Woods	50.1	33.7	56.6	40.3	53.2	37.2	62.8	42.1	74.7	59.3	80.6	66.2	91.4	73.1	81.3	67.5	78.6	63.2	72.1	56.8	59.0	42.3	49.2	35.5
Wilmington	53.4	34.1	64.4	45.3	63.1	40.7	69.8	49.3	79.8	61.6	84.4	66.9	88.7	74.1	84.7	70.3	79.8	61.9	71.7	53.0	62.7	40.8	56.4	38.9
Ohio:																								
Cincinnati	39.2	20.3	49.2	32.0	49.7	33.1	63.3	42.8	77.9	60.0	82.5	64.9	91.0	71.2	85.7	65.7	78.0	58.3	63.6	43.0	53.8	33.2	42.3	26.4
Cleveland	33.1	15.1	39.9	23.6	37.8	24.1	54.4	35.8	70.8	52.4	75.8	60.0	85.1	67.1	77.2	61.3	70.2	52.4	58.5	42.0	48.7	31.4	37.4	24.1
Columbus	36.1	17.5	44.6	28.2	45.5	29.1	61.6	40.1	77.7	57.6	81.4	61.1	90.3	68.9	82.2	59.5	75.7	52.4	61.9	40.9	51.2	32.2	39.9	25.6

Sandusky	31.7	14.5	38.4	23.4	38.4	25.5	54.5	36.7	70.1	54.3	77.8	61.4	86.5	69.4	79.0	62.8	71.7	55.2	59.4	41.3	49.4	30.9	37.1	23.2
Toledo	28.7	12.3	36.4	21.4	39.5	24.2	56.0	36.4	73.1	55.1	78.8	60.6	87.3	67.0	79.1	60.6	71.1	52.7	57.6	40.1	47.7	30.1	35.5	22.2
Oregon:																								
Ashland	48.2	31.8	42.2	23.9	62.9	35.7	61.5	36.6	72.9	42.8	77.8	45.6	87.0	50.7	82.9	50.2	78.9	44.0	72.2	39.1	54.9	32.2	44.5	28.9
Astoria	47.7	38.8	39.7	30.2	51.9	41.7	52.9	42.9	64.0	47.4	62.6	51.3	64.8	53.5	65.5	54.8	64.3	52.5	59.6	49.4	50.2	42.1	46.9	40.1
Klamath, Fort	39.4	23.0	30.6	7.4	49.6	27.1	53.4	30.5	64.3	32.9	68.7	34.4	86.4	37.4	79.6	36.1	72.5	30.2	63.8	23.7	47.0	20.3	35.8	17.9
Lakeview	39.2	22.8	32.7	13.0	53.0	31.8	54.8	30.9	65.6	38.6	71.6	44.2	82.9	50.8	82.9	48.8	.....	.....	64.9	35.9	54.1	22.7	40.0	22.4
Linkville	41.7	30.3	39.3	16.7	57.8	33.6	58.5	34.9	68.1	42.2	71.7	42.9	82.5	49.6	78.2	49.3	74.5	42.0	65.4	35.1	49.2	26.7	38.8	24.1
Portland	47.7	36.8	38.4	25.7	58.8	40.9	59.5	42.0	69.3	48.2	71.4	50.4	78.5	54.2	75.8	54.9	71.9	49.3	63.4	45.0	50.6	38.5	47.0	37.9
Roseburgh	49.2	37.6	41.7	26.8	61.9	39.6	60.8	41.0	70.2	45.4	73.3	45.7	81.6	49.0	78.5	51.3	77.2	45.1	68.4	40.4	54.5	36.4	48.7	35.7
Pennsylvania:																								
Erie	38.1	14.5	42.1	20.0	40.7	21.9	53.2	33.7	69.7	51.6	75.8	58.5	84.3	67.5	77.5	59.8	69.7	51.6	58.7	41.6	51.4	32.2	41.2	25.5
Philadelphia	39.5	23.7	43.4	29.1	43.8	28.9	60.4	41.1	78.3	57.9	81.1	62.0	89.0	72.3	82.0	65.9	71.9	57.4	64.0	48.8	53.2	38.8	43.8	30.4
Pittsburgh	40.2	21.7	46.5	30.9	45.9	29.0	62.3	41.4	79.3	57.7	81.8	61.9	90.2	70.4	81.6	62.2	74.3	54.8	62.5	43.8	52.3	35.8	43.2	28.8
Rhode Island:																								
Block Island	39.6	23.0	40.5	26.8	40.0	28.2	49.7	38.1	62.3	50.1	67.6	56.3	76.9	66.8	74.0	63.2	66.5	56.6	59.7	49.3	50.4	38.4	41.8	30.5
Narragansett Pier	36.7	19.3	39.0	23.1	40.5	25.0	51.5	34.2	66.5	48.6	71.1	55.0	80.6	66.4	75.8	60.2	68.3	52.0	59.9	43.3	52.0	34.0	42.0	26.4
South Carolina:																								
Charleston	53.4	37.9	65.9	50.1	65.0	46.6	71.7	55.5	80.4	66.4	85.4	71.3	88.7	76.1	86.7	74.2	80.5	67.6	73.2	58.7	64.6	47.8	57.3	44.3
Columbia[4]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	89.2	67.5	91.7	72.6	86.3	68.9	82.2	62.6	70.3	51.0	63.5	42.0	52.6	37.2
Tennessee:																								
Chattanooga	49.9	29.9	59.9	43.3	61.6	41.7	73.8	49.4	82.4	60.6	86.0	64.0	87.6	70.9	87.4	67.8	83.2	60.6	68.6	48.7	61.5	39.5	47.7	33.6
Knoxville	47.7	27.0	58.1	40.7	58.7	38.5	70.7	46.3	81.5	59.1	84.9	62.6	89.0	70.3	85.6	66.4	81.1	58.2	67.9	45.6	59.2	35.9	46.5	31.8
Memphis	49.4	32.1	57.8	41.6	63.1	45.8	74.2	53.7	83.7	64.2	87.3	67.0	91.1	72.5	89.4	70.6	84.8	64.8	71.4	50.1	63.1	41.0	48.0	34.0
Nashville	47.5	27.6	58.1	39.4	59.4	40.2	71.9	46.8	81.8	59.3	85.3	64.2	90.8	71.3	89.7	67.8	83.0	61.6	67.7	46.3	59.8	36.2	46.0	31.2
Texas:																								
Abilene	57.9	31.5	63.0	37.6	73.7	47.0	78.5	53.8	83.9	62.4	89.5	68.6	95.5	73.4	91.2	72.3	84.5	67.2	71.4	52.2	63.8	41.6	49.9	30.9
Brownsville	68.6	49.0	74.9	60.3	77.5	58.7	80.8	65.7	86.7	68.8	87.0	72.3	89.3	75.0	90.6	76.0	86.3	73.1	77.7	64.7	73.7	59.8	65.5	49.6
Corpus Christi[5]	.....	.....	70.0	56.4	73.1	58.2	74.5	65.4	81.2	70.4	83.7	75.3	87.4	76.4	86.5	77.5	83.5	73.1	75.7	62.8	70.4	56.0	59.8	45.3
Davis, Fort	60.9	32.8	66.3	37.4	70.3	40.2	76.5	47.1	82.4	56.7	86.0	62.8	87.1	65.0	85.8	65.7	77.1	60.9	69.6	47.3	63.9	41.7	50.9	30.3
Elliott, Fort	50.5	20.0	55.6	25.8	67.2	34.4	70.6	43.0	79.3	53.6	85.8	62.9	93.8	66.1	88.7	65.3	80.4	58.5	68.7	42.8	61.2	31.8	46.6	21.2
El Paso	60.1	31.6	63.6	35.7	75.0	42.2	78.5	46.3	86.2	57.0	94.7	66.5	94.9	67.6	92.8	68.6	86.6	64.1	77.6	50.7	68.9	39.6	52.7	28.7
Galveston	57.6	44.5	68.5	57.8	70.9	60.3	74.7	65.0	81.4	70.7	85.3	75.0	88.4	78.1	88.8	77.5	84.7	74.3	74.6	64.1	70.1	57.8	58.8	47.4
Palestine	57.2	35.7	65.7	45.9	72.9	51.2	77.0	55.4	83.5	62.0	88.7	68.5	94.6	72.1	93.0	72.1	85.4	66.3	74.8	53.9	68.1	45.7	54.1	38.4
Rio Grande	73.3	45.4	79.8	60.0	84.2	58.3	88.1	66.0	92.7	69.9	91.6	73.3	95.7	74.9	97.4	75.7	91.0	73.0	80.8	61.6	74.2	57.4	62.7	43.3
San Antonio	63.4	37.9	69.6	49.3	78.0	53.2	80.1	58.4	86.8	63.6	89.4	69.9	95.9	73.3	93.8	73.9	87.0	69.5	77.1	58.1	70.2	49.4	58.4	41.1
Utah:																								
Frisco	41.4	22.6	36.8	20.7	54.7	36.4	54.0	34.3	66.1	45.1	76.3	54.9	81.7	62.1	79.4	60.2	73.1	52.2	60.7	39.7	50.9	33.3	33.9	16.3
Salt Lake City	41.0	25.3	42.0	26.2	58.3	36.2	59.9	38.4	73.0	48.5	81.8	55.4	88.2	61.6	86.1	60.6	78.6	52.4	63.1	40.0	54.2	31.3	36.8	21.5
Vermont:																								
Northfield[3]	.....	.....	.....	.....	31.0	11.9	46.0	24.1	71.2	45.2	73.1	51.0	80.1	60.8	71.6	49.2	63.6	39.9	52.2	34.0	40.5	23.0	27.5	12.6
Virginia:																								
Cape Henry	49.2	31.4	57.5	39.5	52.8	36.4	62.5	45.2	71.7	58.9	78.9	63.2	86.3	75.9	80.7	69.9	75.5	62.7	68.8	54.0	57.5	42.4	51.1	36.4
Chincoteague[6]	42.8	27.5	50.9	35.2	47.4	33.0	56.8	42.0	70.1	55.8	74.0	59.7	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Lynchburgh	44.8	26.3	54.1	35.4	53.9	33.8	64.9	42.2	79.9	57.8	83.8	61.5	91.3	69.9	85.1	65.3	78.2	56.8	66.9	45.9	58.7	36.3	45.6	30.2
Norfolk	48.3	30.1	57.7	39.4	53.9	35.9	63.5	43.7	77.6	59.8	81.6	64.7	89.9	73.0	82.6	68.5	77.6	61.3	68.5	52.9	58.6	40.2	50.1	35.6
Washington Territory:																								
Canby, Fort	48.2	39.5	39.9	30.3	50.4	41.4	52.4	49.0	59.5	47.2	60.6	49.6	60.0	51.3	61.9	53.6	61.7	51.6	58.6	49.5	51.5	42.8	47.5	39.8
Olympia	45.6	36.4	38.2	24.0	52.6	38.2	55.7	45.5	65.9	43.8	68.5	45.2	74.6	48.1	72.2	49.0	67.5	45.3	57.4	42.0	48.8	37.4	55.5	36.8

[1] Observations began July 12, 1887.
[2] Observations began March 1, 1887.
[3] Closed until June 1, 1888.
[4] Observations began June 5, 1887.
[5] Observations began February 1, 1887.
[6] Discontinued July 1, 1887.

Mean maximum and mean minimum temperature (in degrees Fahrenheit), etc.—Continued.

Stations.	January.		February.		March.		April.		May.		June.		July.		August.		September.		October.		November.		December.	
	Max	Min.	Max	Min.	Max	Min.	Max	Min.	Max	Min.	Max	Min.	Max	Min.	Max	Min.	Max	Min.	Max	Min.	Max	Min.	Max	Min.
Washington Territory—Cont'd.																								
Port Angeles	44.2	33.1	37.1	21.2	47.5	33.9	50.6	35.7	58.5	40.6	59.7	44.7	61.6	46.4	63.2	47.3	59.6	43.6	53.2	38.7	47.1	33.5	44.7	33.6
Spokane Falls	38.0	25.2	27.8	8.7	53.8	31.9	60.2	35.9	69.0	41.4	73.0	46.4	84.4	52.2	81.9	52.3	70.6	42.6	57.4	33.3	44.6	27.4	38.7	26.1
Spokane, Fort[1]	36.9	22.0	31.6	7.8	55.7	32.1	60.3	36.5	72.6	39.3	74.4	48.5	87.3	51.6	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Tatoosh Island	46.0	38.7	37.9	30.4	48.4	40.0	49.6	41.2	55.7	44.8	58.2	48.0	59.9	49.3	60.4	50.2	58.1	48.3	54.0	46.5	49.8	42.7	47.0	40.3
Walla Walla	48.3	34.9	30.1	16.4	59.5	40.7	63.0	41.8	72.8	48.8	76.2	51.8	88.8	60.6	85.6	58.9	73.8	50.7	62.7	41.8	49.2	34.2	46.8	33.4
Wisconsin:																								
Green Bay	17.8	—3.1	25.3	6.0	32.0	14.7	50.7	31.6	72.8	51.2	77.3	56.4	84.4	63.6	74.9	56.7	65.9	49.2	50.9	34.8	39.6	23.8	29.4	17.8
La Crosse	20.8	1.2	27.2	4.6	37.9	21.7	58.7	36.6	77.1	53.8	82.2	60.6	85.9	64.8	77.8	58.8	68.4	50.7	54.1	35.1	41.6	24.6	28.8	14.0
Milwaukee	23.2	4.4	30.2	14.2	36.9	22.4	52.2	35.5	66.1	48.9	72.4	54.3	81.0	64.3	74.2	60.0	67.8	53.6	54.4	38.2	43.8	28.8	33.1	19.7
Wyoming:																								
Bridger, Fort	30.8	12.3	27.2	5.7	45.6	27.0	51.1	28.4	63.4	35.4	72.9	41.7	77.7	49.5	71.9	45.9	71.1	36.5	55.1	28.6	48.3	21.1	29.9	7.4
Cheyenne	(2)	(2)	(2)	(2)	54.8	29.8	54.9	32.1	68.9	39.8	78.7	50.3	80.5	52.2	77.6	50.6	72.8	45.6	57.3	30.0	51.4	24.4	37.6	14.0
Laramie, Fort	39.1	16.3	34.4	6.3	58.3	28.4	60.8	32.4	75.8	41.9	85.1	53.3	88.4	57.5	82.0	55.4	77.3	46.2	61.9	28.8	53.3	17.6	36.3	13.6

[1] Discontinued August, 1887.

[2] No record.

APPENDIX No. 22.

Mean of the maximum and minimum temperature (in degrees Fahrenheit) at the cotton-region stations of the Signal Service, U. S. Army, from May to October, 1887, inclusive.

[These means are obtained by dividing the sum of the daily readings of self-registering thermometers by the number of observations taken, one daily, at 5 p. m., central time.]

States and stations.	May.		June.		July.		August.		September.		October.	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
Alabama:												
Calera	90.3	57.6	94.8	60.2	94.8	68.9	.....	(1)	(1)	(1)	(1)	(1)
Decatur	88.3	59.8	92.7	63.6	93.7	69.1	92.3	66.7	87.6	59.4	73.1	45.9
Eufala	82.5	64.2	87.1	67.8	86.2	72.4	85.9	69.6	84.2	61.8	72.7	54.1
Evergreen	87.5	55.4	91.6	58.7	92.5	62.0	92.6	60.4	87.4	54.4	76.4	45.1
Fort Deposit	87.2	63.9	90.9	68.1	90.6	72.1	90.2	70.5	85.9	64.4	73.8	53.5
Greenville	87.6	(2)	89.4	67.8	90.9	71.8	91.1	70.0	87.3	65.0	75.5	54.5
Livingston	87.6	92.3	92.0	65.9	92.4	70.7	92.5	70.4	89.4	63.8	74.1	51.9
Marion	85.6	63.9	90.2	70.9	92.3	71.7	91.3	69.7	86.0	64.5	74.2	52.8
Opelika	86.2	63.2	90.4	66.4	91.1	70.2	89.2	69.5	83.0	63.0	71.3	52.1
Pine Apple	88.5	61.3	91.8	65.3	91.4	72.0	91.7	70.1	84.2	61.2	74.4	51.3
Scottsborough	85.2	56.5	87.9	58.0	90.1	69.1	89.1	67.4	85.6	58.3	71.5	46.7
Selma	86.9	64.4	90.1	66.0	88.2	72.4	91.2	69.5	87.8	63.2	(2)	(2)
Tuscumbia	85.7	59.3	90.1	60.1	91.6	68.5	91.8	66.1	86.3	58.7	71.7	43.9
Arkansas:												
Arkansas City	(2)	(2)	93.4	66.3	94.0	71.7	94.7	70.9	89.0	63.7	(2)	(2)
Brinkley	85.5	68.1	90.9	70.3	94.3	76.0	92.5	72.3	89.4	67.5	(2)	(2)
Devall's Bluff	80.0	68.9	87.7	68.9	90.1	62.1	90.3	62.6	87.3	53.4	73.7	44.5
Forrest City	85.2	47.3	89.6	47.4	93.8	59.3	91.3	64.8	84.5	59.6	76.0	52.7
Helena	81.5	58.5	89.3	65.2	93.6	70.5	91.6	69.2	87.3	62.5	75.2	47.6
Kensett	82.2	59.8	85.9	63.9	90.5	69.6	78.8	67.1	86.7	61.2	(2)	(2)
Malvern	(2)	(2)	90.5	61.9	97.7	65.3	94.5	58.8	89.5	50.1	76.8	48.1
Monticello	87.7	50.8	90.2	53.6	92.8	59.1	93.7	59.1	88.7	52.9	78.0	39.5
Newport	85.0	59.0	87.4	64.1	92.2	67.6	90.5	62.1	85.9	53.9	75.4	43.4
Pine Bluff	(2)	(2)	90.5	69.2	94.3	71.4	92.9	70.2	88.1	65.3	75.6	49.6
Prescott	(2)	(2)	89.2	68.2	91.5	72.2	89.6	71.4	84.6	65.8	73.6	52.7
Russellville	84.4	61.3	88.7	64.9	95.0	69.6	91.7	68.4	85.7	63.5	73.6	46.8
Texarkana	86.1	56.1	87.6	58.7	92.4	68.7	91.3	68.3	91.9	62.5	81.0	55.3
Florida:												
Live Oak	87.6	66.5	90.0	68.7	94.3	73.6	92.2	72.4	88.4	66.5	79.6	58.1
Georgia:												
Albany	88.1	63.4	91.1	69.2	92.6	74.5	94.8	73.2	88.0	66.5	76.4	54.9
Allapaha	86.1	61.6	89.5	67.0	91.1	71.2	89.4	70.8	85.5	63.7	75.7	56.5
Athens	88.2	60.5	92.3	64.5	93.0	71.4	89.4	68.1	84.8	60.2	71.8	48.0
Bainbridge	86.9	63.7	89.5	69.0	91.2	74.2	90.6	72.8	86.3	65.3	75.9	57.1
Camak	86.0	60.6	89.8	66.1	90.7	71.3	87.3	69.3	83.9	61.1	72.3	50.5
Cartersville	84.9	60.8	88.1	64.5	88.4	70.9	87.7	68.6	83.4	61.7	69.8	49.8
Columbus	86.7	65.6	89.8	70.3	89.9	74.2	88.8	72.2	86.1	66.3	74.5	56.0
Eastman	88.2	62.1	92.1	67.9	93.7	70.7	90.2	68.1	86.0	63.2	75.8	50.9
Fort Gaines	88.6	64.3	90.9	67.6	93.0	72.7	91.4	70.9	87.8	63.6	75.0	53.7
Gainesville	81.4	56.6	85.5	63.1	86.7	67.6	84.4	65.5	81.0	60.2	70.0	48.0
Griffin	85.3	63.7	88.6	68.0	88.9	75.6	87.3	70.1	82.7	64.0	71.6	52.5
Jessup	89.1	62.9	92.1	68.4	95.6	73.1	93.3	72.4	87.3	64.3	77.5	57.7
Macon	87.9	63.5	91.8	67.9	92.5	73.0	90.8	71.5	85.3	64.5	74.5	53.1
Millen	88.8	63.8	93.8	68.9	93.6	72.8	92.0	70.9	87.0	62.4	75.6	52.2
Newnan	87.9	61.9	91.3	65.5	92.9	70.7	90.7	68.2	85.4	60.7	72.0	48.4
Quitman	88.9	65.0	91.7	70.4	92.6	72.8	92.5	70.8	87.4	66.7	78.2	59.5
Smithville	90.7	62.5	92.9	67.0	94.8	72.3	93.7	70.2	88.3	63.5	75.4	53.5
Thomasville	86.7	57.3	87.3	61.5	90.8	68.5	92.3	64.2	89.4	58.2	83.2	54.5
Toccoa	82.3	58.3	87.2	63.9	88.5	69.7	84.6	67.0	80.4	60.0	68.5	49.4
Union Point	84.0	60.9	87.8	66.0	89.2	70.3	85.9	67.9	82.0	59.7	73.2	49.5
Washington	89.3	60.0	91.9	65.9	93.0	71.0	88.8	67.7	86.5	62.2	74.3	50.0
Way Cross	87.7	64.7	91.0	70.8	95.4	75.0	92.2	73.1	86.1	66.0	76.8	57.5
Waynesborough	85.5	60.6	90.3	68.8	91.6	73.5	88.5	71.6	84.0	63.1	73.0	52.7
West Point	86.0	62.8	89.5	67.3	90.7	72.5	88.2	69.8	83.7	63.3	71.4	51.6

[1] Closed. [2] Missing.

Mean of the maximum and minimum temperature, etc.—Continued.

States and stations.	May.		June.		July.		August.		September.		October.	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
Louisiana:												
Alexandria	86.0	63.4	88.6	68.6	91.5	72.0	92.2	71.8	87.0	64.6	77.2	53.3
Amite City	90.7	60.9	94.9	67.3	94.6	70.8	94.0	71.6	88.2	64.4	77.0	53.8
Cheneyville	89.3	63.1	91.1	68.9	93.7	71.4	93.6	69.6	89.6	65.2	78.9	52.9
Coushatta	89.6	61.1	93.8	66.2	93.8	70.4	92.1	69.5	87.2	62.6	76.1	48.6
Lafayette	87.7	66.1	88.2	70.3	91.5	73.9	90.6	72.9	87.5	67.8	78.1	56.9
Minden	88.8	63.2	92.4	68.0	94.0	7.18	94.4	71.8	89.7	65.3	77.0	51.4
Monroe	86.5	58.2	92.3	65.4	92.5	68.8	92.2	67.7	88.5	65.5	75.5	54.7
Natchitoches	87.1	64.2	89.8	69.2	91.8	73.0	90.5	72.3	86.4	65.5	73.6	50.3
Opelousas	89.5	65.5	90.9	69.0	94.5	71.7	92.8	70.5	88.1	66.0	77.5	54.8
Mississippi:												
Aberdeen	82.3	62.3	86.4	65.3	88.4	70.5	88.0	67.9	86.1	61.7	69.0	52.7
Batesville	83.1	62.3	86.9	66.1	89.7	72.8	90.0	69.9	86.4	64.0	72.2	49.4
Brookhaven	88.2	62.4	91.6	67.1	92.1	70.1	91.9	69.2	87.5	63.3	75.2	51.7
Columbus	90.8	63.7	95.9	64.7	96.6	65.5	96.5	61.3	92.2	56.2	74.8	42.3
Corinth	85.5	53.9	90.0	63.2	92.3	72.1	94.4	73.8	88.5	72.0	74.1	54.2
Edwards	88.4	64.5	91.5	69.2	92.9	73.1	92.0	73.1	88.5	65.8	73.5	53.6
Grenada	84.9	59.5	91.1	59.9	92.2	68.5	91.6	66.0	87.5	58.1	72.0	46.6
Hazlehurst	88.5	63.6	91.0	67.2	91.9	70.8	91.5	70.4	87.7	64.9	74.0	53.1
Hernando	84.7	61.2	87.9	64.1	91.6	70.3	89.5	66.5	86.7	62.2	70.0	41.5
Holly Springs	86.3	63.8	90.1	66.1	92.0	70.9	90.5	68.6	82.7	63.1	70.1	48.6
Jackson	88.6	61.1	91.8	67.7	92.8	70.8	92.4	71.1	81.6	60.6	74.4	52.3
Lake	87.5	55.0	90.3	70.9	92.8	75.3	91.1	76.4	87.3	70.7	74.8	56.1
Macon	89.8	62.5	93.7	66.9	96.1	71.8	95.3	68.3	92.1	61.8	72.3	43.9
Meridian	90.3	61.1	92.9	64.6	95.5	70.4	93.4	66.2	89.7	59.0	75.5	50.2
Natchez	87.4	63.7	90.6	68.0	91.3	70.5	91.1	69.9	86.5	63.8	73.9	51.9
Okalona	89.7	64.9	94.2	67.4	95.9	74.9	94.9	72.2	91.8	55.5	76.1	42.1
Oxford	86.0	63.9	89.5	67.2	91.6	75.6	91.0	70.3	87.4	65.4	72.8	50.1
Port Gibson	90.2	61.4	93.4	69.1	90.6	71.4	93.1	70.8	88.3	66.6	72.5	60.5
Waynesborough	87.6	61.5	90.8	67.1	92.2	72.1	92.6	70.2	87.8	62.4	76.6	52.6
North Carolina:												
Goldsborough	81.0	62.1	87.9	66.7	92.1	72.7	86.2	70.0	79.5	63.5	65.7	57.0
Lumberton	83.3	60.5	88.2	64.5	92.9	71.5	86.7	68.7	81.3	58.3	69.4	51.0
New Berne	81.3	61.7	87.3	67.3	92.0	75.6	86.0	70.1	80.8	62.0	71.9	52.5
Raleigh	83.5	59.6	88.6	64.0	92.6	71.8	86.1	67.9	77.1	59.3	(1)	(1)
Salisbury	81.5	59.7	86.9	55.4	91.9	63.8	84.0	58.5	80.5	50.8	69.2	39.6
Wadesborough	84.0	59.7	88.1	64.7	90.0	72.0	86.4	68.5	82.2	59.5	68.8	48.8
Weldon	88.3	60.5	92.6	62.3	97.3	70.8	91.0	66.7	85.6	56.6	70.9	47.0
South Carolina:												
Allendale	88.0	62.2	90.6	68.1	92.0	72.3	88.4	71.3	83.6	62.2	73.4	52.8
Anderson	87.6	57.8	92.9	61.8	95.1	70.9	88.9	67.0	85.6	58.8	69.6	46.3
Batesburg	86.6	53.4	92.4	63.5	93.9	69.8	87.7	66.0	84.6	61.2	71.8	51.4
Blackville	87.0	55.8	92.0	67.1	92.0	71.9	90.2	70.1	83.4	61.6	72.0	51.3
Branchville	85.6	60.6	90.3	66.2	92.4	72.1	90.4	70.5	85.4	60.6	74.2	49.5
Cheraw	84.5	59.7	90.7	64.9	95.4	72.0	87.0	67.9	82.1	60.1	73.9	51.2
Chester	87.4	60.5	93.1	66.0	96.6	72.6	88.9	67.9	85.0	60.5	72.4	48.4
Columbia	85.4	60.9	91.6	66.3	92.3	72.7	87.4	68.7	82.2	63.2	70.3	51.5
Florence	85.6	62.4	91.4	66.7	93.9	73.3	89.4	70.6	83.9	61.3	72.0	50.9
Greenville	86.8	56.4	92.6	62.1	94.5	69.7	85.8	66.2	82.6	58.6	69.0	47.0
Greenwood	86.7	60.8	90.0	66.0	92.3	71.5	87.1	67.6	84.0	61.6	70.9	49.5
Hardeeville	86.3	61.8	90.1	66.8	93.3	73.3	91.3	72.7	85.5	64.0	75.9	55.0
Jacksonborough	86.4	57.2	91.5	63.2	93.6	68.8	90.9	66.2	86.7	59.4	76.3	51.9
Kingstree	84.7	59.9	90.0	63.3	92.5	71.6	88.2	68.5	83.1	58.4	72.3	48.4
Saint Georges	87.4	59.4	91.6	65.2	92.6	71.6	90.2	70.0	84.9	60.5	74.4	52.3
Saint Matthews	85.1	62.2	91.5	66.7	93.5	72.6	88.0	69.6	85.0	61.0	72.3	50.7
Spartanburg	83.7	53.4	89.3	62.8	92.4	68.6	85.3	66.0	82.6	57.8	69.4	39.0
Yamassee	85.8	60.0	91.5	64.9	92.9	72.8	90.6	72.0	85.2	64.7	75.3	57.3
Tennessee:												
Arlington	90.4	59.4	91.5	62.1	93.9	66.5	92.2	64.9	88.5	60.9	77.3	46.4
Bolivar	85.5	60.0	88.7	64.5	91.9	71.4	92.3	67.6	87.6	60.3	73.1	48.2
Brownsville	86.5	62.1	89.1	65.5	91.9	71.5	91.6	68.4	85.4	61.2	71.9	46.6
Covington	86.1	60.5	89.1	63.4	94.7	70.3	92.4	67.1	85.8	60.7	73.0	47.9
Dyersburg	86.4	60.9	90.5	63.7	94.4	70.2	93.6	66.8	84.6	60.9	71.5	45.0
Grand Junction	85.2	59.4	88.4	62.5	91.0	66.3	90.1	67.3	86.8	63.2	71.5	48.1
Milan	86.4	61.6	90.2	64.7	95.8	71.4	91.7	67.6	84.6	61.6	71.2	47.0
Paris	83.5	56.5	86.6	57.5	93.1	62.0	89.8	60.1	81.6	55.2	67.9	47.7
Texas:												
Austin	(2)	63.4	91.1	71.1	97.2	76.5	95.2	76.0	90.1	67.1	81.0	55.8
Belton	87.1	63.4	92.6	69.4	99.3	74.1	95.7	73.7	88.6	66.6	79.6	53.2
Brenham	89.4	65.9	92.3	71.6	98.2	73.9	96.2	74.5	89.6	69.1	78.5	56.5
Columbia	87.2	65.5	88.4	71.1	91.2	72.5	93.5	73.4	85.3	69.1	77.6	56.2
Corsicana	90.6	62.1	94.3	68.8	99.8	71.7	96.6	72.8	88.0	66.3	77.2	47.3
Cuero	90.9	64.5	93.2	71.3	96.8	73.4	98.0	76.0	92.2	71.8	81.9	66.1
Dallas	87.3	63.2	93.1	70.4	96.6	73.4	95.1	72.7	90.2	65.8	78.2	42.5
Houston	88.5	56.5	91.4	70.1	95.4	73.2	93.7	73.6	87.2	68.8	78.5	58.6
Huntsville	88.0	65.8	91.2	69.9	97.0	74.7	95.8	73.2	89.1	68.2	78.0	56.5

[1] Missing. [2] No record.

Mean of maximum and minimum temperature, etc.—Continued.

States and stations.	May.		June.		July.		August.		September.		October.	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
Texas—Continued.												
Longview	87.9	62.0	94.7	68.8	95.9	72.6	95.3	72.9	90.6	65.5	78.9	52.3
Luling	87.1	67.9	91.3	74.1	96.2	77.5	94.8	78.5	88.4	73.6	(1)	(1)
Paris	84.4	61.0	90.1	66.8	93.9	71.0	(1)	(1)	82.8	65.4	(1)	(1)
Sour Lake	(1)	(1)	90.2	74.3	94.6	79.4	93.0	64.4	88.7	60.5	79.5	57.3
Tyler	87.7	62.9	91.1	66.9	97.2	71.5	92.8	70.5	88.4	65.4	78.1	51.4
Waco	85.3	63.4	95.0	70.1	99.7	76.4	96.2	76.1	88.9	70.0	75.8	55.8
Weatherford	86.2	57.6	91.3	64.3	98.3	68.5	93.3	66.9	85.6	62.7	73.7	48.6
Weimar	87.4	62.0	92.2	69.9	95.9	72.6	(2)	(2)	(2)	(2)	(2)	(2)

[1] Missing. [2] Closed.

APPENDIX No. 23.

Table of maximum and minimum temperature and annual range of temperature at Signal Southern Pacific Railroads and connecting branches, for

Stations.	Character of station.	January.		February.		March.		April.		May.		June.	
		Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
		°	°	°	°	°	°	°	°	°	°	°	°
Alabama:													
Auburn	S. W. S.	71	9	76	28	75	30	85	39	91	61	.....	.....
Bermuda	S. W. S.	74	15	79	33	78	35	88	37	90	62	95	60
Carrollton	S. W. S.	72	6	76	30	76	30	84	36	87	58	96	62
Demopolis	S. W. S.	74	11	78	33	.....	.....	88	41	.....	.....	95	68
Eufaula	S. W. S.	77	9	81	29	80	28	86	33	92	52	98	56
Fayette	S. W. S.	60	10	.....	.....	68	28	84	40	94	48	102	58
Florence	S. W. S.	68	7	71	27	71	29	85	35	87	58	96	63
Gadsden	S. W. S.	70	1	74	20	78	19	88	24	93	40	96	48
Greensborough	V. O.	72	12	79	34	77	35	85	42	88	63	.....	.....
Greenville	S. W. S.	70	11	80	33	.....	.....	87	41	94	65	.....	.....
Livingston	V. O.	76	10	78	23	80	34	88	39	90	65	.....	.....
Marion	S. W. S.	69	13	74	31	74	31	84	38	87	60	96	68
Mobile	S. S.	72	16	80	36	77	36	85	41	92	56	93	63
Montgomery	S. S.	74	13	79	34	80	32	87	40	92	60	102	62
Mount Willing	S. W. S.	72	10	76	30	76	30	87	34	93	58	102	54
Newton	S. W. S.	75	16	.....	.....	80	31	89	40	93	61	.....	.....
Oswichee	S. W. S.	.....	.....	77	34	.....	.....	.....	.....	90	65	97	67
Selma	S. W. S.	70	19	75	36	70	37	80	50	90	65	94	68
Trinity	S. W. S.	70	7	72	28	76	30	87	38	88	61	92	62
Tuscaloosa	S. W. S.	71	6	77	27	78	28	88	32	90	54	91	67
Tuscumbia	S. W. S.	71	7	75	27	77	29	86	35	91	56	99	60
Union Springs	S. W. S.	72	13	78	33	76	33	84	35	89	56	97	70
Do	S. W. S.	.....	.....	.....	.....	.....	.....	.....	.....	88	68	97	60
Valley Head	S. W. S.	67	5	73	21	.....	.....	87	35	90	57	94	58
Arizona:													
Apache, Fort	S. S.	65	10	72	13	79	22	82	27	92	32	102	39
Benson	R. R.	73	22	73	30	84	38	86	40	95	52	105	70
Bowie, Fort	S. S.	66	24	65	25	27	37	82	32	90	42	100	55
Casa Grande	R. R.	88	26	82	32	93	48	95	45	102	55	112	67
Grant, Fort	S. S.	70	25	68	23	79	33	81	28	89	42	99	58
Huachuca, Fort	M. P.	72	17	69	16	80	26	78	34	.....	.....	102	60
McDowell, Fort	S. S.	75	18	79	22	93	34	98	38	107	45	119	52
Do	M. P.	79	18	86	23	93	33	97	42	106	45	118	51
Maricopa	S. S.	74	13	87	20	97	37	98	36	108	48	118	53
Do	R. R.	75	29	90	24	95	35	100	40	105	70	112	70
Mojave, Fort	M. P.	.....	.....	80	29	93	41	99	40	107	47	117	50
Patano	R. R.	.....	.....	.....	.....	98	52	91	46	.....	.....	110	54
Phœnix	S. S.	77	22	92	26	97	39	104	40	110	48	118	54
San Carlos Agency	S. S.	67	15	77	20	88	30	92	36	103	44	114	51
San Simon	R. R.	80	17	84	30	98	35	98	38	100	54	112	68
Thomas, Fort	S. S.	66	13	75	14	85	28	91	34	100	39	110	52
Texas Hill	R. R.	78	17	82	32	97	48	100	50	110	67	125	73
Tucson	R. R.	68	42	71	39	91	48	101	49	106	74	108	78
Verde, Fort	S. S.	67	13	77	18	86	30	90	35	97	39	109	42
Whipple Barracks	S. S.	63	11	71	12	76	23	79	23	87	30	97	36
Wilcox	R. R.	69	25	65	29	88	38	88	38	92	40	103	65
Do	S. S.	75	4	76	10	86	22	88	18	95	28	104	42
Yuma	S. S.	76	30	83	35	92	43	97	44	104	44	116	59
Do	R. R.	74	39	73	45	96	55	97	53	105	69	113	74
Arkansas:													
Alexander	S. W. S.	.....	.....	.....	.....	.....	.....	.....	.....	92	53	100	64
Brinkley	S. W. S.	72	4	73	24	78	40	92	41	93	61	98	60
Conway	S. W. S.	72	0	74	22	78	30	93	32	89	50	92	60
Dallas	S. W. S.	.....	.....	.....	.....	.....	.....	.....	.....	95	68	104	68
Eureka Springs	S. W. S.	72	— 8	81	14	80	25	89	28	90	50	88	54
Forrest City	S. W. S.	.....	.....	.....	.....	.....	.....	.....	.....	90	35	96	.....
Fort Smith	S. S.	73	— 4	75	20	76	28	91	30	92	50	95	57
Heber	S. W. S.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	[k]102	[k]62
Helena	S. W. S.	.....	.....	.....	.....	[c]75	[c]28	[c]86	[c]35	[c]92	[c]53	100	55

NOTE.—Letters of alphabet denote number of days missing from the record.

APPENDIX No. 23.

Service, Voluntary, Post Hospital, State Weather Service stations, and those on Central and each month of the year 1887, *in degrees Fahrenheit.*

July.		August.		September.		October.		November.		December.		Annual range.	Authority.
Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.		
°	°	°	°	°	°	°	°	°	°	°	°	°	
96	72	92	62	95	51	80	32	75	18	68	19	.....	W. D. Dunlap, Howard Lamar.
94	72	.....	.....	96	54	84	34	76	25	69	25	.....	William Fowler.
95	71	95	63	96	48	82	33	76	18	60	18	90	M. L. Stansel.
97	74	93	68	94	56	83	39	70	22	.....	.....	.....	W. W. Legare.
98	65	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	James Milton.
98	70	100	68	104	58	.....	.....	60	23	.....	.....	.....	F. P. McConnell.
96	70	97	64	94	48	81	31	77	19	60	13	90	J. W. Milner.
97	68	92	58	92	42	83	22	78	9	60	10	96	D. P. Goodhue.
96	72	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	Mrs. M. T. Wright.
96	71	.....	.....	94	60	84	40	72	27	73	22	.....	F. S. Persons.
.....	.....	97	60	93	58	80	32	80	22	67	21	.....	J. W. A. Wright.
96	73	.....	.....	98	49	83	40	.....	.....	.....	.....	.....	A. D. Smith.
98	68	93	65	96	53	87	34	80	25	69	25	82	
100	70	96	59	99	50	86	32	79	21	68	22	89	
102	70	.....	.....	.....	.....	.....	.....	.....	.....	68	20	.....	W. M. Garrett.
.....	.....	.....	.....	96	63	.....	.....	81	24	67	31	.....	C. L. McCartha.
98	75	93	73	95	57	83	40	78	27	72	27	.....	W. C. Whitaker.
96	70	.....	.....	94	53	.....	.....	.....	.....	.....	.....	.....	Miss S. V. A. Hunt.
.....	.....	.....	.....	.....	.....	82	33	77	25	60	13	.....	Joseph Shackelford.
94	70	.....	.....	97	46	82	27	76	16	65	17	.....	J. C. Perkins.
98	70	102	61	97	48	84	29	76	17	61	13	95	L. B. Thornton.
98	64	.....	.....	96	66	.....	.....	76	22	68	22	.....	C. M. Franklin.
96	70	.....	.....	97	51	83	40	84	16	68	22	.....	Rev. J. L. Moultrie.
97	68	.....	.....	95	50	80	30	74	10	59	11	.....	E. P. Nicholson.
99	51	98	50	92	44	88	28	74	20	57	1	101	
101	68	103	68	94	62	92	44	78	32	68	11	94	Pacific R. R. system.
98	57	97	60	87	59	86	40	69	29	58	6	94	
112	77	111	78	108	70	101	53	89	38	71	22	90	Do.
98	57	97	58	89	57	90	36	75	28	64	7	92	
99	68	.....	.....	90	51	92	36	80	25	65	0	.....	U. S. post hospital.
118	60	115	64	107	60	102	42	85	31	68	15	104	
116	60	115	63	107	60	101	42	90	31	71	16	102	Do.
[h]114	[h]64	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
116	80	116	73	108	60	100	50	98	45	83	22	94	Pacific R. R. system.
119	61	115	87	109	35	108	25	90	24	69	20	.....	U. S. post hospital.
104	68	110	72	99	69	106	48	90	38	68	14	.....	Pacific R. R. system.
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
110	62	108	54	100	42	96	36	.....	.....	66	11	.....	
110	70	110	70	106	68	102	54	84	30	.....	.....	.....	Do.
108	61	106	62	99	48	95	33	85	27	64	18	97	
122	76	118	79	110	70	108	55	90	37	69	25	102	Do.
104	75	103	71	102	70	96	72	86	54	70	30	78	Do.
104	55	102	57	95	50	96	50	89	34	61	25	96	
94	48	93	50	87	46	85	29	73	20	57	8	89	
101	67	101	63	89	54	88	42	79	23	69	9	94	Do.
103	58	101	58	96	48	94	32	82	18	74	— 2	106	
114	66	112	60	105	62	108	48	91	38	72	27	89	
114	82	111	79	101	77	103	66	87	47	71	34	80	Do.
102	67	102	60	101	49	94	.....	74	18	62	14	.....	P. Williams, Isaiah Williams.
100	71	100	61	99	50	.....	.....	.....	.....	.....	.....	.....	John Flynn, C. A. Potter.
96	60	100	60	100	46	88	22	79	15	63	8	100	A. P. Robinson, C. E.
102	70	103	65	100	68	[a]95	[a]41	79	18	66	10	.....	Thomas M. Carden.
94	63	91	56	83	48	81	30	82	8	60	— 3	102	A. H. Foote.
[a]100	[a]50	99	58	99	50	85	42	.....	.....	.....	.....	.....	W. J. Prude, George Owens.
104	65	101	57	97	45	90	32	79	17	74	8	108	
104	72	104	62	100	54	89	33	76	20	68	10	.....	D. Reeder, M. D.
101	55	101	59	100	48	88	26	.....	.....	63	9	.....	George Warren.

Table of maximum and minimum temperature and

Stations.	Character of station.	January.		February.		March.		April.		May.		June.	
		Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
Arkansas—Continued.		°	°	°	°	°	°	°	°	°	°	°	°
Hot Springs	M. P.	.....	.....	77	23	78	32	92	35	91	55	98	66
Lead Hill	V. O.	75	—7	78	14	85	21	90	27	93	51	101	50
Little Rock	S. S.	72	7	72	23	75	30	90	34	89	52	96	59
Newport	S. W. S.	.....	.....	.....	.....	.....	.....	.....	.....	92	50	97	53
Osceola	S. W. S.	.....	.....	72	28	.....	.....	[a]87	[a]48	92	56	[a]98	[a]62
Pine Bluff	S. W. S.	76	4	.....	.....	.....	.....	.....	.....	.....	.....	98	55
Prescott	S. W. S.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	96	60
Russellville	S. W. S.	71	2	73	21	78	27	92	29	91	50	98	54
Springdale	S. W. S.	[b]71	[b]14	72	13	78	29	88	40	.....	.....	96	59
Texarkana	S. W. S.	.....	.....	.....	.....	.....	.....	89	.....	97	40	[a]98	[a]52
Washington	S. W. S.	.....	.....	.....	.....	.....	.....	.....	.....	[b]88	[b]64	94	64
California:													
Alcatraz Island	M. P.	66	41	.....	.....	74	44	73	42	92	44	68	48
Almaden	R. R.	67	37	64	35	80	40	82	40	96	47	96	53
Anaheim	R. R.	74	34	80	36	85	45	85	44	92	50	98	50
Anderson	V. O.	76	28	74	30	87	36	78	47	108	38	104	56
Angel Island	M. P.	75	36	76	33	89	39	84	40	103	44	90	50
Antioch	R. R.	64	30	64	30	78	42	82	48	100	54	101	58
Aptos	R. R.	70	30	70	28	82	34	72	40	78	38	80	48
Athlone	R. R.	69	39	62	28	84	43	85	46	102	48	104	55
Auburn	R. R.	65	27	69	24	78	36	87	36	100	40	106	50
Benicia Barracks	M. P.	66	36	61	33	75	42	80	43	101	46	104	52
Bidwell, Fort	S. S.	52	6	44	—2	67	18	76	19	93	20	93	31
Do	M. P.	53	8	44	1	69	21	77	21	94	22	96	33
Bishop Creek	R. R.	70	12	67	23	85	33	92	42	101	50	102	60
Boca	R. R.	55	—10	45	—26	62	—5	70	24	86	27	95	32
Borden	R. R.	66	25	70	26	83	38	89	44	106	50	108	60
Brentwood	R. R.	74	30	60	37	80	49	90	49	101	51	107	57
Brighton	R. R.	72	30	75	30	82	43	88	48	106	50	110	60
Byron	R. R.	68	24	72	30	94	38	92	50	107	52	112	66
Caliente	R. R.	64	30	68	32	72	44	80	42	104	46	102	50
Calistoga	R. R.	70	26	70	25	80	34	86	39	104	41	109	50
Chico	R. R.	69	30	70	28	80	40	87	48	107	50	113	52
Cisco	R. R.	46	14	37	8	49	25	60	20	85	20	85	30
Colfax	R. R.	64	30	62	21	80	38	83	38	102	42	104	44
Colton	R. R.	98	40	74	30	90	45	90	42	99	47	102	61
Corning	R. R.	71	29	67	30	75	40	90	46	112	46	108	60
Davis	R. R.	72	37	72	31	89	41	88	47	106	48	110	54
Delano	R. R.	75	26	70	28	80	40	92	50	106	54	108	62
Delta	R. R.	68	23	66	21	76	32	82	30	102	34	100	47
Dunnigan	R. R.	72	32	66	31	83	47	88	50	108	50	111	62
Elmira	R. R.	80	31	86	31	86	40	92	48	107	46	112	54
Emigrant Gap	R. R.	64	22	44	16	59	30	71	30	84	30	88	38
Eureka	S. S.	59	27	62	27	64	34	64	36	75	35	64	40
Fall Brook	V. O.	78	29	85	35	88	41	87	44	94	44	103	51
Farmington	R. R.	65	26	70	29	83	41	90	43	110	48	111	55
Fresno	R. R.	66	28	74	31	86	43	90	48	105	50	108	54
Galt	R. R.	68	28	67	29	77	40	77	42	103	60	101	68
Gaston, Fort	M. P.	.....	.....	.....	.....	80	30	91	33	107	31	108	38
Gilroy	R. R.	72	22	75	27	80	35	78	43	103	47	100	52
Goshen	R. R.	70	23	65	24	86	40	92	40	108	54	110	60
Hollister	R. R.	70	28	78	31	90	37	88	35	102	48	100	55
Indio	R. R.	86	32	96	38	102	55	98	50	102	60	114	72
Ione	R. R.	64	22	66	22	82	35	81	41	109	40	109	50
Keeler	S. S.	64	25	63	22	77	33	81	32	98	37	99	44
Do	R. R.	64	26	63	23	77	35	81	34	93	42	99	49
Keene	R. R.	75	24	62	25	75	35	78	32	93	37	96	45
King City	R. R.	72	21	74	23	89	33	89	36	109	47	105	47
Kingsburgh	R. R.	65	26	70	25	86	36	88	46	104	50	106	56
Knight's Landing	R. R.	76	28	70	30	61	40	72	42	94	47	105	52
Lathrop	R. R.	66	20	70	25	85	35	84	42	104	48	105	53
Lemoore	R. R.	62	21	74	30	83	36	85	40	106	40	107	52
Lewis Creek	V. O.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	110	56
Livermore	R. R.	85	28	72	28	83	32	88	40	104	44	106	50
Livingston	R. R.	83	28	70	35	86	43	84	48	104	51	107	56
Los Angeles	S. S.	80	33	82	35	85	41	87	40	92	44	100	47
Do	R. R.	.....	.....	84	36	85	44	84	47	86	54	93	54
Mammoth Tank	R. R.	80	30	86	38	101	54	107	57	112	68	128	84
Martinez	R. R.	62	30	60	30	72	36	80	40	94	42	90	50
Marysville	R. R.	62	32	54	33	66	48	83	47	103	48	105	58
Mason, Fort	M. P.	64	41	68	36	73	45	73	48	75	50	81	53
Menlo Park	R. R.	74	28	65	28	81	34	84	22	102	42	103	44
Merced	R. R.	68	30	68	28	84	40	86	44	102	48	106	56
Modesto	R. R.	62	36	67	30	80	42	87	45	104	50	107	40
Mojave	R. R.	67	23	64	28	88	42	88	47	104	58	101	58

annual range of temperature, etc.—Continued.

July.		August.		September.		October.		November.		December.		Annual range.	Authority.
Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.		
°	°	°	°	°	°	°	°	°	°	°	°	°	
99	67	98	60	99	51	90	33	82	19	64	27	.....	U. S. post hospital.
109	57	110	54	104	43	95	23	90	11	67	—1	117	Silas C. Turnbo.
100	64	99	59	97	50	89	33	77	Zero	65	14	100	
102	57	99	48	99	40	91	29	.....	.....	.....	.....	.....	J. M. Thompson.
*99	*67	98	64	.....	.....	89	30	70	18	.....	.....	.....	Dr. D. A. Richardson.
*102	*65	101	60	100	51	*91	*30	.....	.....	.....	.....	.....	H. B. Mizell, W. E. McEwen.
100	69	96	61	94	52	91	34	78	20	.....	.....	.....	William Friganza.
103	67	101	56	98	48	90	27	.....	.....	.....	.....	.....	W. B. McDonald.
101	66	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	John B. Gill.
101	57	100	61	99	54	89	49	74	29	58	20	.....	M. J. Nash.
99	70	97	62	99	52	90	34	86	19	68	16	.....	A. H. Carrigan.
64	48	66	49	83	50	85	50	73	44	66	41	.....	U. S. post hospital.
95	55	95	50	98	48	90	47	74	35	65	35	61	Pacific R. R. system.
94	58	95	60	94	60	94	54	90	40	72	40	64	Do.
108	60	102	50	96	48	85	46	52	26	.....	.....	.....	Dr. A. Fouch.
86	50	81	50	85	47	95	49	80	41	78	38	70	U. S. post hospital.
98	60	96	60	98	60	88	49	78	29	68	33	72	Pacific R. R. system.
75	48	75	45	80	45	85	40	78	28	67	31	57	Do.
106	68	102	61	99	58	95	48	80	30	60	28	78	Do.
100	57	98	52	98	38	94	48	77	30	70	30	82	Do.
91	53	93	53	95	53	87	52	71	34	69	39	71	U. S. post hospital.
94	39	92	32	85	29	85	23	67	4	51	10	96	
98	42	94	35	86	31	86	25	68	5	48	10	97	Do.
100	71	99	68	89	45	90	46	76	25	70	31	90	Pacific R. R. system.
96	40	89	36	88	28	85	16	71	2	50	—12	122	Do.
114	60	108	58	103	56	95	44	84	30	60	26	89	Do.
101	65	100	67	103	62	84	39	75	28	62	29	79	Do.
108	60	106	58	104	54	98	50	84	28	70	32	82	Do.
109	58	106	56	100	46	.....	.....	80	28	64	32	.....	Do.
104	68	100	64	98	50	90	50	76	40	60	34	74	Do.
101	48	96	38	95	46	95	38	80	17	70	30	92	Do.
114	75	110	52	105	54	95	45	80	30	62	32	86	Do.
83	44	81	31	78	34	76	31	60	20	47	14	77	Do.
100	58	97	51	98	48	98	48	86	39	58	30	83	Do.
113	63	104	60	102	60	102	48	92	32	84	30	83	Do.
110	70	108	66	110	62	90	52	73	40	64	32	83	Do.
109	53	106	50	104	48	100	40	82	26	65	31	84	Do.
112	75	108	65	103	65	*93	*52	87	35	70	30	86	Do.
107	50	.....	.....	.....	.....	90	35	79	23	60	24	.....	Do.
108	60	109	59	98	58	89	50	76	32	68	27	84	Do.
102	55	104	56	100	58	93	45	80	26	67	30	86	Do.
90	50	86	44	86	46	81	38	68	22	53	22	74	Do.
60	43	62	48	68	42	82	40	67	34	60	35	48	
106	57	98	53	100	53	94	48	87	42	75	33	77	F. E. Fox.
108	60	106	55	106	51	99	47	87	30	62	28	85	Pacific R. R. system.
109	65	107	57	103	50	76	48	80	34	62	32	81	Do.
105	65	101	63	.....	.....	73	52	73	43	69	41	.....	Do.
110	42	106	40	96	30	89	25	72	18	55	21	.....	U. S. post hospital.
98	48	100	50	100	50	95	40	80	22	65	28	81	Pacific R. R. system.
111	68	107	67	106	59	100	40	83	32	68	28	88	Do.
92	52	90	47	96	50	90	40	86	26	71	33	76	Do.
110	78	122	69	109	72	103	53	90	34	85	27	95	Do.
104	58	104	52	103	47	90	40	76	21	62	24	88	Do.
99	61	99	53	92	54	91	45	70	28	66	23	77	
99	66	98	58	91	57	91	46	69	34	65	25	76	Do.
100	51	94	50	92	48	86	52	78	38	57	29	76	Do.
98	50	98	49	103	48	95	40	90	23	69	25	88	Do.
108	66	105	58	102	56	98	40	82	26	60	24	84	Do.
102	58	100	55	93	50	95	50	78	35	59	35	77	Do.
107	59	100	55	98	47	97	38	76	21	63	28	87	Do.
110	64	101	60	102	55	98	47	80	28	62	21	89	Do.
104	66	105	58	100	56	97	48	82	38	60	32	.....	John Tuohy.
104	52	99	52	104	50	95	44	82	30	74	30	78	Pacific R. R. system.
108	68	104	61	103	61	90	48	80	34	69	32	80	Do.
98	51	94	52	91	49	93	47	86	39	73	35	67	
97	60	92	59	88	57	93	50	85	42	75	32	.....	Do.
.....	.....	115	70	110	70	100	64	92	34	75	32	.....	Do.
88	50	80	46	86	46	84	44	78	28	64	32	66	Do.
97	57	98	58	90	65	91	48	79	27	73	34	78	Do.
68	52	70	53	75	53	80	52	68	43	63	49	45	U. S. post hospital.
87	46	86	44	94	46	89	40	75	26	60	32	81	Pacific R. R. system.
108	62	104	56	102	50	115	46	82	30	66	30	87	Do.
108	57	103	50	102	50	100	43	81	28	59	30	80	Do.
108	70	102	69	98	60	89	60	75	45	85	30	81	Do.

Table of maximum and minimum temperature and

Stations.	Character of station.	January.		February.		March.		April.		May.		June.	
		Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
California—Continued.		°	°	°	°	°	°	°	°	°	°	°	°
Monterey	R. R.	68	28	70	26	79	34	78	43	85	50	80	55
Napa	R. R.	71	26	58	26	86	35	80	42	101	34	101	50
Newhall	R. R.	75	20	70	27	88	35	90	40	92	50	98	56
Nicolaus	V. O.	71	30	71	30	83	42	86	42	102	42	102	50
Niles	R. R.	63	32	66	32	84	43	.....	.....	.....	.....	99	49
Oakland	V. O.	66	35	66	31	76	38	76	40	101	43	85	48
Do	R. R.	60	40	62	34	66	42	66	48	80	44	76	50
Orland	R. R.	76	34	70	30	78	40	84	42	108	48	102	48
Oroville	V. O.	70	32	70	32	84	37	86	38	102	39	104	54
Pajaro	R. R.	80	28	68	30	80	38	79	35	80	38	80	48
Paso Robles	R. R.	67	15	72	20	82	35	86	38	105	44	98	48
Petaluma	R. R.	70	31	68	32	80	40	83	48	102	50	102	55
Pleasanton	R. R.	90	25	77	27	88	38	86	42	105	49	102	49
Poway	V. O.	79	27	.....	.....	83	42	83	45	.....	.....	93	56
Presidio of San Francisco.	M. P.	68	37	67	34	77	41	76	36	94	39	79	44
Red Bluff	S. S.	71	30	69	28	80	39	90	38	110	40	105	47
Do	R. R.	80	32	70	29	86	40	92	44	112	44	110	51
Redding	R. R.	71	30	60	28	80	40	90	43	105	54	105	53
Riverside	V. O.	78	26	84	29	88	39	90	43	90	44	99	47
Rocklin	R. R.	65	32	68	31	80	40	84	48	103	38	107	50
Sacramento	S. S.	65	30	67	30	79	41	84	41	98	39	100	47
Do	R. R.	60	32	59	33	73	46	74	45	91	49	92	53
Do	V. O.	65	26	65	24	81	34	83	37	99	34	100	42
Salinas	V. O.	70	28	72	29	82	33	70	40	70	44	78	50
Do	R. R.	71	28	60	28	75	40	75	38	90	45	78	54
San Ardo	R. R.	68	26	73	28	83	40	85	43	98	45	98	52
San Diego	S. S.	74	38	76	38	82	44	80	44	79	48	78	54
San Fernando	R. R.	84	32	76	33	87	47	91	52	96	59	100	62
San Francisco	S. S.	73	42	67	33	78	45	78	44	97	46	90	48
San Gorgonio	R. R.	75	32	62	32	80	44	88	40	90	48	98	49
San José	R. R.	71	31	70	32	78	38	84	42	104	44	95	46
San Mateo	R. R.	70	34	65	32	74	42	80	44	100	50	92	50
San Miguel	R. R.	65	21	80	24	83	40	89	43	102	47	105	52
Santa Barbara	V. O.	79	37	79	37	83	43	80	41	86	46	95	44
Santa Cruz	R. R.	74	32	74	34	78	42	77	40	77	43	83	50
Santa Monica	R. R.	74	34	72	36	72	41	83	42	80	48	77	54
Selma	R. R.	65	28	72	29	90	33	95	45	99	53	104	59
Soledad	R. R.	76	24	80	22	90	34	86	40	98	40	94	50
Soquel	R. R.	68	30	68	34	78	42	78	46	76	42	82	44
South Side	R. R.	70	26	70	27	81	38	84	34	.....	.....	.....	.....
South Vallejo	R. R.	70	39	70	32	75	44	82	51	103	51	95	58
Spadra	R. R.	79	30	75	31	86	40	87	40	.....	.....	98	53
Stockton	R. R.	64	30	66	32	78	42	80	44	98	47	102	50
Suisun	R. R.	73	31	68	35	90	42	88	48	105	50	109	53
Summit	R. R.	45	9	38	3	46	23	56	17	74	21	78	28
Sumner	R. R.	69	28	69	30	85	45	96	46	106	55	109	60
Tehama	R. R.	76	30	56	30	78	44	87	38	100	40	102	48
Tehachapi	R. R.	60	20	54	10	74	32	74	30	90	30	92	38
Templeton	R. R.	68	18	81	23	90	34	94	40	108	47	101	48
Towlest	R. R.	80	28	66	14	76	40	78	30	92	30	100	34
Tracy	R. R.	69	31	68	30	88	38	88	48	111	49	111	55
Traver	R. R.	63	24	68	25	87	40	90	42	.....	.....	108	58
Truckee	R. R.	58	—4	40	—10	60	20	62	20	88	20	88	36
Tulare	R. R.	72	27	64	28	89	38	90	42	102	43	100	56
Turlock	R. R.	80	26	80	29	92	35	96	48	109	50	109	50
Williams	R. R.	62	32	62	32	80	38	89	42	109	48	108	56
Willows	V. O.	.....	.....	.....	.....	.....	.....	.....	.....	112	42	110	45
Do	R. R.	75	32	76	27	82	44	89	48	109	55	106	55
Woodland	R. R.	68	30	70	30	84	40	89	42	100	47	106	60
Colorado:													
Alma	S. W. S.	38	—4	40	—16	48	0	70	19	68	18	79	35
Aspen	S. W. S.	.....	.....	.....	.....	.....	.....	78	32	87	32	88	34
Cañon City	S. W. S.	60	0	66	6	76	24	84	37	90	38	96	54
Climax	S. W. S.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	*58	*29
Collins, Fort	V. O.	79	—13	70	—8	80	7	83	16	90	24	96	45
Colorado Springs	S. S.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Do	S. W. S.	67	—10	66	—2	72	7	78	12	83	29	89	43
Denver	S. S.	67	—18	71	—3	75	13	82	20	89	31	96	44
Georgetown	S. W. S.	48	—8	50	2	56	11	65	11	74	22	82	38
Golden	S. W. S.	.....	.....	.....	.....	.....	.....	.....	.....	90	32	94	48
Grand Junction	V. O.	.....	.....	.....	.....	.....	.....	.....	.....	94	34	102	55
Husted	S. W. S.	62	—15	65	—13	76	4	82	13	87	23	95	36
Idaho Springs	S. W. S.	58	—13	60	0	68	12	78	10	82	23	96	41

annual range of temperature, etc.—Continued.

July.		August.		September.		October.		November.		December.		Annual range.	Authority.
Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.		
°	°	°	°	°	°	°	°	°	°	°	°	°	
.....	.....	74	54	83	50	90	48	74	38	66	37	.....	Pacific R. R. system.
90	50	92	45	95	42	92	38	75	20	70	29	81	Do.
106	60	102	58	100	57	97	44	88	30	72	25	86	Do.
99	52	99	52	100	54	96	48	79	26	72	28	76	Alvah Pendleton.
93	49	83	49	98	49	89	49	86	48	.....	.....	.....	Pacific R. R. system.
71	51	79	51	82	48	89	46	68	32	67	35	70	Dr. J. B. Trembley.
68	52	72	50	76	50	90	50	60	34	64	38	56	Pacific R. R. system.
108	62	106	58	100	60	96	50	85	33	64	34	78	Do.
101	57	97	54	96	53	91	45	80	31	67	34	73	Hiram Arento.
71	53	72	50	88	52	90	42	80	22	75	32	68	Pacific R. R. system.
105	48	102	47	100	48	92	34	77	33	72	23	90	Do.
90	50	99	49	96	50	95	44	78	28	76	36	74	Do.
99	55	104	49	100	46	92	44	81	22	72	30	83	Do.
97	60	96	58	93	57	92	48	85	32	.....	.....	.....	Adams Chapin.
68	45	72	45	89	44	89	42	77	34	71	32	62	United States post hospital.
112	56	107	55	101	48	96	47	80	27	68	32	82	
115	66	108	60	108	56	100	54	84	32	68	33	86	Pacific R. R. system.
109	60	104	60	99	55	94	48	79	28	63	30	81	Do.
105	50	100	49	98	48	94	42	85	33	72	30	79	A. K. Holt.
104	57	100	54	96	57	90	48	75	29	60	30	78	Pacific R. R. system.
99	48	100	48	100	46	92	42	75	28	65	29	72	Do.
93	57	90	54	88	50	85	40	68	31	60	32	62	
100	48	96	47	96	42	87	37	71	18	61	24	82	S. H. Gerrish.
72	43	70	53	78	47	92	42	78	28	66	32	64	Dr. E. K. Abbott.
74	52	71	51	75	47	90	43	68	28	61	31	62	Pacific R. R. system.
100	50	99	49	98	50	95	45	80	30	63	30	74	Do.
79	60	77	54	79	58	85	50	82	44	74	36	43	
106	60	103	60	.....	.....	96	50	97	50	73	30	.....	Do.
70	49	74	49	89	50	87	49	74	42	69	40	64	
108	58	100	60	96	52	92	50	92	36	.....	.....	.....	Do.
92	50	87	50	94	50	88	45	80	30	65	33	74	Do.
80	54	83	54	91	50	89	45	77	52	61	38	68	Do.
108	52	106	49	107	47	100	41	85	28	69	25	87	Do.
86	49	81	53	81	51	92	48	85	40	74	38	58	Hugh De Vail.
75	46	80	51	91	45	90	41	82	32	72	36	59	Pacific R. R. system.
77	60	76	60	72	56	110	54	84	40	80	40	76	Do.
107	60	105	60	100	58	91	42	80	31	67	27	80	Do.
84	48	86	46	90	48	90	38	78	22	70	26	76	Do.
78	46	86	40	76	42	88	52	80	32	70	34	58	Do.
101	58	102	52	98	50	99	50	92	34	70	38	.....	Do.
93	52	88	48	90	54	89	45	83	35	72	37	71	Do.
94	48	100	57	100	50	100	50	88	38	70	32	.....	Do.
98	55	94	50	96	51	92	46	70	32	58	34	72	Do.
96	53	100	56	100	50	94	42	78	28	71	32	81	Do.
80	43	80	33	76	31	75	31	62	15	42	7	77	Do.
111	75	106	67	100	65	95	50	83	31	62	31	83	Do.
103	57	101	50	100	50	95	42	85	35	60	33	73	Do.
94	58	88	50	90	44	84	40	74	20	56	20	84	Do.
107	47	108	46	108	45	103	35	85	26	70	26	90	Do.
98	50	94	40	100	40	96	40	80	30	70	20	86	Do.
111	57	102	55	100	50	98	44	83	30	62	34	81	Do.
112	63	110	55	108	58	.....	.....	.....	.....	65	24	.....	Do.
87	46	86	41	80	30	73	24	62	8	42	0	98	Do.
108	63	100	60	100	57	93	54	89	29	61	27	81	Do.
112	56	108	55	98	52	96	45	86	29	65	23	89	Do.
109	65	105	60	100	56	96	46	85	26	68	32	83	Do.
112	51	108	52	100	45	97	42	78	23	64	28	.....	David Bentley.
107	65	106	66	98	60	97	50	81	27	63	32	82	Pacific R. R. system.
104	66	96	59	95	60	93	63	88	48	75	33	76	Do.
.....	.....	.....	.....	.....	.....	.....	.....	58	0	.....	.....	.....	W. H. Powless.
92	49	88	46	88	32	79	22	68	3	.....	.....	.....	L. W. Thiele.
96	60	92	49	92	44	.....	.....	.....	.....	.....	.....	.....	F. P. Blake, M. D.
66	36	68	35	58	30	52	24	40	— 3	.....	.....	.....	George C. Wortman.
97	51	96	46	91	32	88	11	78	—13	61	0	110	Prof. Elwood Meade.
90	48	90	46	84	36	82	9	71	—16	56	—14	.....	
90	48	90	46	84	36	82	9	71	—16	56	—14	106	Central Office.
92	50	95	47	88	35	85	8	74	—14	67	—14	114	
80	44	79	40	74	32	69	11	62	— 2	47	—13	95	W. A. Jayne, M. D,
94	34	96	48	87	41	87	10	73	— 9	.....	.....	.....	J. M. Shields.
100	63	96	52	90	38	84	26	70	4	52	— 5	.....	Dr. I. F. Ingersoll and Frank McClintock.
[b]97	[b]43	95	41	85	30	84	12	73	—27	59	—27	124	E. P. Moon.
89	*43*	*86*	*40*	*80*	*33*	78	10	66	— 2	53	—13	102	Ignatius Zeller.

Table of maximum and minimum temperature and

Stations.	Character of station.	January.		February.		March.		April.		May.		June.	
		Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
Colorado—Continued.		°	°	°	°	°	°	°	°	°	°	°	°
Las Animas	S. S.	76	—18	76	— 6	81	18	87	21	90	35	96	51
Lewis, Fort	M. P.	47	— 5	44	— 9	63	16	72	20	82	15	86	32
Longmont	S. W. S.	62	—20	70	— 2	77	16	84	34	90	38	98	50
Monte Vista	S. W. S.	42	—15	46	1	64	14	72	45	.....	.....	88	40
Montrose	S. S.	60	2	59	2	72	16	78	21	89	28	93	41
Pandora	S. W. S.	.....	.....	73	— 8	90	9	72	9	81	21	86	28
Pike's Peak	S. S.	19	—21	27	—23	31	— 5	38	—6	44	—2	56	21
Pueblo	S. W. S.	.....	.....	.....	.....	78	20	84	38	[4]86	[4]36	.....	.....
Red Mountain	S. W. S.	.....	.....	46	0	58	12	58	26	68	16	65	42
Saguache	S. W. S.	48	— 7	54	0	69	19	72	40	85	34	86	47
Trinidad	S. W. S.	64	— 8	68	4	72	22	78	33	80	34	91	41
T. S. Ranche	S. W. S.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	96	56
West Cliffe	S. W. S.	59	— 9	58	0	68	4	.....	.....	.....	.....	.....	.....
Connecticut:													
Canton	N. E. M. S.	50	—14	46	0	45	7	75	20	89	32	88	42
Colchester	N. E. M. S.	.....	.....	.....	.....	52	12	80	20	86	34	89	42
Hartford	V. O.	47	—20	47	2	.....	.....	80	20	89	38	95	42
Middlebrook	N. E. M. S.	53	—15	52	5	52	11	82	22	88	38	94	43
New Haven	S. S.	51	— 5	53	8	51	12	80	23	86	42	90	44
New London	S. S.	56	0	54	10	53	15	79	24	82	44	84	47
North Colebrook	V. O.	49	—16	.....	.....	45	— 3	67	10	82	32	80	42
Shelton	N. E. M. S.	50	—10	.....	.....	50	13	77	21	86	36	91	44
Southington	V. O.	52	—17	51	3	54	11	80	23	91	46	91	53
Thompson	N. E. M. S.	50	—10	48	2	49	11	.....	.....	86	39	87	45
Voluntown	V. O.	60	— 5	54	2	57	12	84	22	88	48	89	50
Waterbury	N. E. M. S.	48	—20	48	2	52	7	73	16	86	32	90	41
Dakota:													
Abraham Lincoln, Fort	M. P.	36	—48	37	—36	43	—28	91	3	92	31	101	38
Bismarck	S. S.	44	—44	45	—43	54	—15	87	12	91	26	97	38
Buford, Fort	S. S.	42	—45	47	—41	59	—10	88	12	93	32	98	39
Deadwood	S. S.	45	—18	58	—29	65	10	73	16	80	31	92	40
Garden City	V. O.	32	—33	37	—29	64	—13	85	14	87	30	90	36
Highmore	V. O.	.....	.....	36	—30	.....	—14	94	13	90	15	96	32
Huron	S. S.	38	—43	47	—30	68	— 4	94	16	92	32	97	38
Meade, Fort	M. P.	49	—33	71	—37	73	— 2	86	13	88	27	98	38
Parkston	V. O.	.....	.....	38	—22	60	—10	94	16	98	38	99	40
Pembina, Fort	M. P.	22	—45	33	—40	44	—27	62	— 2	97	22	95	32
Randall, Fort	M. P.	51	—33	45	—22	66	— 8	94	17	94	19	100	27
Richardton	V. O.	32	—38	40	—32	50	— 9	86	16	87	32	97	45
Sisseton, Fort	M. P.	32	—40	38	—38	67	—13	91	2	94	27	91	33
Sully, Fort	S. S.	34	—28	49	—26	62	— 8	92	19	92	32	99	44
Do	M. P.	40	—30	50	—27	70	— 5	95	19	95	33	102	43
Totten, Fort	S. S.	35	—39	35	—36	52	—23	84	1	90	29	91	35
Do	M. P.	32	—31	27	—36	57	—20	84	2	90	29	91	36
Webster	V. O.	34	—44	45	—39	74	—22	93	7	96	29	96	39
Yankton	S. S.	47	—29	50	—22	78	— 2	90	19	90	36	94	45
Yates, Fort	S. S.	44	—38	49	—34	57	—11	92	15	93	31	101	41
Do	M. P.	29	—50	30	—33	54	—11	88	12	92	30	101	39
District of Columbia:													
Kendall Green	V. O.	.....	.....	69	16	54	22	78	30	84	56	.....	.....
Rock Creek Bridge	V. O.	68	9	76	20	60	25	84	34	90	60	94	60
Reservoir (distributing).	V. O.	66	7	73	20	53	24	82	31	91	57	93	58
Reservoir (receiving).	V. O.	64	4	71	17	55	22	82	30	86	54	94	56
Washington City	S. S.	67	6	73	19	65	21	84	28	89	50	95	50
Florida:													
Archer	V. O.	71	23	81	35	80	32	84	36	84	52	92	62
Cedar Keys	S. S.	70	24	77	39	76	40	82	42	87	57	89	64
Duke	V. O.	75	25	85	36	84	31	90	38	94	55	94	63
Homeland	V. O.	82	28	85	45	85	34	93	44	91	59	93	67
Jacksonville	S. S.	76	22	84	38	80	36	89	38	91	55	95	64
Key West	S. S.	79	50	81	58	82	58	84	61	86	60	87	69
Limona	V. O.	82	28	87	44	88	40	91	46	90	63	93	69
Manitee	V. O.	84	31	88	46	89	45	89	50	89	66	95	68
Meade, Fort	V. O.	82	27	87	43	87	31	91	40	91	65	94	70
Merritt's Island	V. O.	80	35	85	45	84	43	90	.....	89	51	90	70
Nama	V. O.	84	31	88	42	87	30	91	44	92	62	92	69
Pensacola	S. S.	68	20	76	38	75	40	92	44	90	62	89	65
St. Augustine, Fort	M. P.	79	27	83	39	79	37	89	40	90	59	94	67
Sanford	S. S.	80	32	85	44	83	39	90	44	91	54	95	64
Tallahassee	V. O.	76	21	82	40	79	38	87	44	.....	.....	92	70
Titusville	S. S.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	93	[1]65

annual range of temperature, etc.—Continued.

July.		August.		September.		October.		November.		December.		Annual range.	Authority.
Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.		
°	°	°	°	°	°	°	°	°	°	°	°	°	
100	55	100	52	95	34	92	21	79	—16	58	—11	118	
86	30	88	21	80	21	76	8	65	21	40	—30	118	United States post hospital.
*94	*59	92	51	88	36	....	24	71	—21	.....	.....	.....	Edwin J. Clark, M. D.
92	51	86	41	85	32	*78	*21	64	— 1	55	—25	.....	C. S. Aldrich.
94	48	90	42	84	28	83	23	65	8	48	—16	110	
86	34	.....	.....	.....	.....	84	19	72	—10	64	—22	.....	C. Lafergue.
55	29	56	22	51	15	44	0	36	—14	25	—39	95	
96	65	91	53	88	40	*88	*23	.....	.....	.....	.....	.....	V. G. Hills and A. S. Dwight.
72	46	68	30	68	32	65	26	.....	.....	.....	.....	.....	William Gray.
.....	.....	82	46	*81	*38	76	24	66	0	.....	—17	.....	J. W. Rambo, M. D.
91	55	90	53	86	30	86	24	74	13	.....	.....	.....	Prof. H. E. Gordon.
94	60	92	48	88	45	86	34	69	11	.....	.....	.....	E. A. Rider.
84	47	84	43	77	30	.....	.....	.....	.....	.....	.....	.....	J. E. MacNiell and A. Comstock.
100	56	87	45	80	32	78	16	62	15	52	3	114	G. J. Case.
89	58	86	46	78	30	75	.....	65	16	58	6	.....	S. P. Willard.
96	58	93	46	.....	.....	75	21	68	6	51	6	.....	W. W. Ellsworth, J. Murtaugh.
94	58	90	47	80	32	76	22	67	17	58	6	109	H. D. A. Ward.
90	60	86	50	78	36	75	25	63	18	66	8	95	
89	63	84	52	77	38	73	30	63	17	57	9	89	
88	53	83	40	76	30	74	17	60	8	52	— 2	.....	Rev. William Goodwin.
91	59	88	43	78	35	74	25	62	10	55	9	.....	F. B. Wheeler.
93	61	89	52	82	28	75	20	65	15	55	6	112	L. Andrews.
89	61	84	50	76	35	.....	.....	62	12	56	3	.....	Miss E. D. Larned.
94	61	88	56	79	30	78	25	71	14	60	4	99	Rev. E. Dewhurst.
94	56	90	42	80	27	77	20	65	14	57	4	114	N. J. Welton.
96	50	90	38	90	30	80	2	75	—24	48	—28	149	United States post hospital.
96	50	91	37	85	28	73	2	73	—25	47	—25	140	
98	45	92	44	89	31	80	0	68	—29	45	—25	143	
90	45	88	41	80	33	75	— 7	64	—11	49	—11	121	
92	49	80	37	80	29	80	8	68	—28	38	—24	125	W. C. T. Newell.
100	47	.....	.....	92	29	.....	.....	.....	.....	.....	.....	.....	W. R. McDowell.
99	44	91	40	89	26	78	5	76	—28	40	—23	142	
100	48	98	41	87	34	82	—11	72	—25	52	—32	137	United States post hospital.
104	52	92	41	93	32	79	10	82	—27	42	—22	.....	J. J. Swarts.
.....	.....	88	31	87	18	73	— 9	68	—29	42	—42	.....	United States post hospital.
105	37	100	27	94	18	82	0	70	—41	41	—17	146	Do.
94	52	84	43	82	18	78	1	70	—30	40	—25	135	Prof. Adolph Nordberg.
92	41	88	33	80	28	75	— 6	73	—24	34	—30	134	United States post hospital.
104	53	98	43	94	35	78	4	77	—27	46	—18	132	
108	53	97	48	95	35	79	4	79	—25	49	—18	138	Do.
90	44	84	37	81	26	68	1	70	—23	41	—36	130	
92	45	87	34	81	28	65	1	67	—22	40	—32	128	Do.
100	48	89	30	90	22	76	1	77	—27	40	—36	144	Prof. Arthur Betts.
98	53	99	44	91	35	80	13	78	—18	45	—16	128	
103	46	97	35	90	30	78	3	76	—21	44	—19	141	
99	38	95	47	87	38	81	1	76	—24	45	—25	151	United States post hospital.
.....	.....	.....	.....	.....	.....	83	34	69	23	57	16	.....	Deaf and Dumb Institute.
104	73	98	59	91	45	87	33	73	23	60	18	95	Washington Water Works.
102	70	96	52	86	44	85	31	68	23	58	17	95	Do.
100	70	96	54	86	41	84	34	68	22	58	15	96	Do.
103	64	92	51	90	40	85	31	70	23	59	14	97	Signal Service.
98	66	95	65	93	62	95	37	88	24	82	28	75	Dr. J. C. Neal.
92	69	92	70	91	62	86	39	77	27	73	34	68	
100	67	94	67	94	69	89	42	82	28	78	35	75	B. P. Ferrill.
98	73	95	72	92	62	89	44	84	33	82	45	70	J. S. Wade.
100	69	97	68	95	55	88	40	78	26	76	31	78	
90	70	89	75	88	72	86	67	82	57	80	63	40	
97	73	94	74	93	68	88	45	85	32	81	41	69	J. G. Knapp.
94	74	96	79	94	74	93	47	88	36	85	35	65	Mary W. Broberg.
97	75	94	78	93	65	90	42	85	34	83	36	70	A. H. Adams.
95	72	95	68	92	69	86	46	81	37	79	47	60	Rev. James H. White.
94	72	95	73	93	65	88	44	87	37	80	39	64	C. E. Robbins.
99	71	93	69	94	59	83	38	76	28	70	30	79	
94	70	92	68	90	68	86	52	78	27	76	32	67	United States post hospital.
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
93	75	92	76	93	56	86	36	79	26	72	29	.....	Rev. W. H. Carter.
99	68	94	69	92	64	87	45	82	32	81	40	.....	

Table of maximum and minimum temperature and

Stations.	Character of stations.	January.		February.		March.		April.		May.		June.	
		Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
Georgia:		°	°	°	°	°	°	°	°	°	°	°	°
Athens	V. O.	67	10	73	29	73	25	86	29	87	51	97	52
Atlanta	S. S.	69	9	74	29	75	25	88	37	89	57	97	57
Augusta	S. S.	74	15	77	31	83	29	93	30	94	46	103	59
Forsyth	V. O.	72	14	84	34	84	32	91	38	92	62	101	66
Milledgeville	V. O.	73	12	78	31	78	28	88	32	94	56	100	57
Quitman	V. O.	74	19	79	38	79	36	87	39	.....	.....	.....	.....
Savannah	S. S.	71	16	80	35	81	32	89	36	89	56	100	60
Idaho:													
Boisé Barracks	M. P.	52	14	55	9	74	23	90	22	98	28	97	38
Boisé City	S. S.	55	16	53	6	74	24	86	22	97	26	95	38
Lewiston	V. O.	60	29	68	2	82	31	92	33	103	36	98	39
Sherman, Fort	M. P.	46	12	58	—12	65	3	72	23	92	31	87	38
Illinois:													
Aledo	S. W. S.	46	25	50	—10	70	12	83	18	91	44	97	48
Albion	S. W. S.	64	— 8	71	15	71	17	89	28	95	52	102	54
Atwood	S. W. S.	60	—24	57	0	68	10	90	20	.....	.....	98	46
Aurora	S. W. S.	45	—25	54	— 5	71	5	86	18	92	40	99	44
Belvidere	S. W. S.	40	—28	46	—10	68	10	88	26	91	45	99	50
Benton	S. W. S.	.....	.....	.....	.....	.....	.....	89	35	96	59	104	60
Beason	S. W. S.	52	—24	52	4	.....	.....	.....	.....	95	52	102	54
Cairo	S. S.	66	— 1	72	12	75	24	87	33	87	53	96	54
Cedarville	S. W. S.	42	—31	43	—12	66	—4	86	20	89	46	98	50
Centralia	S. W. S.	54	—18	68	8	75	21	92	30	94	53	102	56
Charleston	V. O.	62	—20	67	4	74	17	90	20	92	47	100	50
Chicago	S. S.	52	—15	58	— 7	68	9	82	19	86	42	96	48
Collinsville	V. O.	60	—18	72	4	75	22	84	28	85	49	96	49
Decatur	S. W. S.	58	—26	63	0	68	12	85	24	86	46	94	54
Eberle	S. W. S.	59	—12	.....	.....	.....	.....	92	30	.....	.....	94	52
Fairfield	S. W. S.	66	—12	74	16	78	26	92	28	92	56	98	56
Fairview	S. W. S.	46	—24	57	— 5	.....	15	67	22	80	40	80	50
Flora	S. W. S.	61	—16	69	10	70	14	84	24	85	47	91	47
Geneseo	V. O.	49	—29	55	—11	72	6	85	19	90	42	98	50
Golconda	S. W. S.	66	— 6	75	19	77	22	88	33	90	59	96	56
Greenville	S. W. S.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	96	51
Griggsville	S. W. S.	52	—25	67	—1	67	18	87	24	89	48	.....	.....
Hennepin	S. W. S.	53	—31	56	—5	74	8	90	20	93	42	102	42
Hoopeston	S. W. S.	65	—30	60	—4	67	10	87	17	92	38	94	52
Irishtown	S. W. S.	62	—19	69	5	78	20	92	29	90	54	98	56
Jacksonville	V. O.	54	—20	64	—2	71	17	83	22	86	51	.....	.....
Joliet	S. W. S.	49	—21	51	—2	78	8	88	22	94	40	99	49
Jordan's Grove	S. W. S.	.....	.....	75	8	81	18	95	26	93	52	96	56
Kankakee	S. W. S.	54	—19	54	—2	66	12	84	26	90	50	98	58
Lacon	S. W. S.	53	—32	.....	.....	72	14	88	24	94	53	100	55
Lake Forest	S. W. S.	46	—17	51	—8	67	6	80	23	86	45	102	51
Lanark	S. W. S.	.....	.....	.....	.....	.....	.....	.....	.....	87	43	97	53
Martinsville	S. W. S.	57	—22	66	7	70	20	90	28	93	50	98	57
Mascoutah	S. W. S.	61	—16	72	6	82	16	89	30	90	46	99	46
Mattoon	V. O.	65	—21	73	6	74	18	89	22	91	50	99	54
McLeansborough	V. O.	66	—11	74	10	76	14	90	28	93	50	102	50
Melvin	S. W. S.	54	—23	55	—1	68	15	86	26	85	48	90	54
Minonk	S. W. S.	54	—22	56	—4	70	10	84	22	90	50	98	58
Monmouth	V. O.	48	—26	50	—8	70	8	.....	.....	.....	.....	.....	.....
Mount Morris	V. O.	.....	.....	.....	.....	.....	.....	90	12	90	35	.....	.....
Neponset	S. W. S.	46	—26	54	—10	70	6	.....	.....	89	44	98	44
North Caledonia	S. W. S.	65	— 7	68	19	74	24	87	34	88	57	100	57
Olney	S. W. S.	55	— 7	.....	.....	.....	.....	67	30	.....	.....	.....	.....
Oneida	S. W. S.	50	—26	58	— 8	72	16	86	24	92	50	100	55
Oquawka	S. W. S.	.....	.....	.....	.....	.....	.....	87	32	98	52	104	60
Oswego	S. W. S.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Ottawa	S. W. S.	52	—26	54	— 6	61	12	82	22	89	48	93	54
Pana	S. W. S.	58	—20	62	0	67	16	80	27	82	46	90	46
Palestine	S. W. S.	61	—14	.....	.....	77	22	86	34	88	56	98	60
Paris	S. W. S.	58	—20	58	4	62	12	79	19	84	52	91	52
Payson	S. W. S.	54	—22	63	— 3	75	19	87	20	.....	.....	98	55
Pekin	V. O.	53	—27	56	— 4	74	11	87	23	92	47	98	45
Peoria	V. O.	56	—21	57	— 1	73	12	90	28	93	48	101	53
Philo	S. W. S.	60	—27	64	0	68	13	91	18	94	46	99	50
Pontiac	S. W. S.	56	—26	52	— 6	72	10	86	16	90	38	98	48
Prairieville	S. W. S.	41	—26	47	—10	70	6	84	20	.....	.....	96	56
Riley	V. O.	42	—25	47	—11	64	— 2	81	18	86	40	94	46
Richview	S. W. S.	51	—14	70	8	74	15	86	27	86	51	98	50
Rockford	V. O.	40	—30	40	—10	63	21	81	23	87	48	95	54
Do.	S. W. S.	.....	.....	42	— 4	65	3	80	25	87	44	94	55
Sandwich	V. O.	46	—26	54	— 5	69	10	89	24	90	51	100	59
South Evanston	V. O.	46	—22	52	— 7	68	6	85	17	85	37	97	43

average range of temperature, etc.—Continued.

July.		August.		September.		October.		November.		December.		Annual range.	Authority.
Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.		
°	°	°	°	°	°	°	°	°	°	°	°	°	
100	65	91	55	95	40	86	36	74	16	62	16	90	Prof. L. H. Charbonnier.
100	59	91	55	95	45	82	30	72	16	65	15	91	
104	69	99	60	98	45	88	39	78	24	72	24	89	
102	73	98	62	101	53	91	44	79	22	74	22	88	F. G. Scott.
100	70	93	60	93	47	81	40	70	21	66	21	88	S. A. Cook.
.....	.....	.....	.....	97	54	87	37	77	26	72	30	.....	J. L. Cutler.
102	69	98	65	93	50	85	42	78	26	71	28	86	
100	45	98	45	93	36	80	18	73	4	56	9	96	United States post hospital.
100	41	97	39	93	33	87	16	72	6	53	9	95	
103	61	103	56	94	39	98	22	81	18	.....	.....	.....	Robert Schleicher.
91	39	94	41	79	30	70	13	56	4	46	9	106	United States post hospital.
102	56	104	42	93	41	83	14	70	— 2	44	11	114	Tyler McWhorter.
.....	.....	.....	.....	.....	.....	85	22	73	0	54	0	.....	B. F. Michels.
100	50	98	46	94	30	82	30	.....	.....	.....	.....	.....	J. W. C. Gray.
104	50	.....	46	93	32	85	16	69	— 1	52	—10	.....	M. M. Robbins.
100	60	102	50	86	40	82	16	69	— 4	62	—18	130	E. L. Lawrence.
104	74	101	63	98	50	82	34	73	10	60	17	.....	J. McPherson.
106	66	100	58	94	46	79	26	76	7	55	— 6	.....	L. H. Sullivan.
98	66	97	58	95	44	82	28	75	10	58	5	99	
99	60	100	50	88	39	80	12	69	— 6	44	—16	131	John Wright.
106	70	.....	.....	.....	.....	.....	.....	.....	.....	58	1	.....	J. L. Hallam.
107	56	106	48	101	32	86	20	78	0	55	— 5	127	J. B. Dazey.
100	61	98	49	92	38	82	14	67	— 1	53	— 5	115	
100	64	102	48	97	38	85	23	75	10	56	— 4	120	J. R. Wadsworth.
.....	.....	101	55	.....	.....	.....	.....	.....	.....	.....	.....	.....	Rev. N. M. Baker.
104	59	.....	.....	100	36	87	28	78	20	59	4	.....	George Strong.
108	66	104	58	100	43	87	28	80	4	58	4	120	Jacob Hall.
g106	g68	101	53	.....	.....	82	22	66	0	40	—12	.....	Jennie Anderson.
102	60	100	50	95	34	82	22	76	6	56	0	118	L. A. Michels.
102	48	100	51	94	34	.....	.....	.....	.....	53	—10	.....	Prof. N. W. Thornton.
103	71	100	60	101	47	87	26	.....	.....	63	6	.....	J. E. Y. Hanna.
104	60	102	46	100	37	85	49	79	6	56	— 5	.....	M. S. Oudyn.
105	51	101	46	102	32	84	18	76	0	55	— 9		L. Eastman.
108	44	107	45	98	30	88	14	72	— 2	57	—11	139	A. T. Purviance.
100	50	100	48	93	32	81	18	74	2	54	— 9	130	Miss C. J. Trego.
104	72	102	62	100	44	85	25	81	9	62	— 3	123	William Rogan.
.....	.....	.....	.....	.....	.....	83	19	76	5	55	— 7	.....	P. J. Hasenstab.
102	50	100	52	98	32	75	17	86	0	52	— 5	123	Anna B. Nash.
104	69	104	54	100	34	89	22	80	10	56	0	.....	W. J. S. Cathcart.
104	60	98	56	.....	.....	72	24	.....	.....	.....	.....	.....	W. M. Wells.
106	57	106	51	94	38	87	16	72	— 2	56	—12	.....	Rev. A. C. Price.
104	54	100	54	91	41	82	12	68	— 2	48	— 5	121	L. R. F. Griffin.
99	57	96	48	86	36	81	12	74	— 5	53	—16	.....	George L. Beeler.
106	65	101	60	97	31	82	24	76	2	54	— 2	128	J. B. Sheapley.
104	66	105	48	101	36	82	22	82	10	56	— 3	121	Dr. G. Leibrock.
108	62	104	51	99	34	85	19	76	4	55	— 5	129	William Dozier.
106	62	104	54	102	39	86	24	79	— 2	58	— 1	117	William P. Gibbs.
100	58	100	55	94	41	80	19	.....	.....	.....	.....	.....	F. R. Dienelt.
104	66	d104	d56	.....	.....	.....	.....	.....	.....	.....	.....	.....	
104	52	95	45	.....	.....	.....	.....	70	— 2	53	—14	.....	J. C. Hutchison.
110	44	105	54	92	32	.....	.....	70	0	48	—16	.....	William Feary.
102	49	.....	.....	93	32	.....	.....	.....	.....	.....	.....	.....	Dr. E. Stetson.
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
106	61	105	58	98	43	.....	.....	74	2	.....	.....	.....	Charles Fahs.
100	66	100	50	.....	.....	84	18	72	— 2	54	—10	.....	J. A. Wetmore.
110	68	108	58	90	46	92	26	80	0	48	—12	.....	R. Hodson.
102	52	102	44	94	31	82	15	66	— 3	50	—12	.....	J. S. Seely.
102	60	100	50	89	34	80	18	67	— 4	52	—14	128	Dr. J. O. Harris.
95	62	95	47	90	35	76	16	70	2	48	— 8	115	J. K. Eberle.
105	68	102	58	97	40	83	28	.....	.....	.....	.....	.....	J. E. Templeton.
100	66	99	51	93	33	81	19	74	4	52	— 4	120	Wilbur T. Cook.
103	62	103	47	.....	.....	.....	.....	79	2	.....	.....	.....	Daniel E. Robbins.
104	55	104	47	95	33	85	19	74	0	56	—11	131	Rev. J. E. Terborg.
106	50	104	52	98	41	86	21	75	5	56	— 6	127	Dr. F. Brendel.
108	50	105	54	96	33	84	16	.....	.....	.....	.....	.....	H. A. Burr.
110	48	108	44	98	28	82	16	74	4	60	—10	136	Isaac Young.
102	62	.....	.....	90	41	80	15	71	— 4	52	—16	.....	Matthias Schick.
98	50	98	44	86	37	79	12	66	— 2	49	—14	123	John W. James.
104	62	103	50	98	35	84	21	79	7	55	— 1	118	A. G. Tucker.
97	58	97	50	86	37	81	16	69	— 4	50	—10	127	T. D. Robertson.
.....	.....	98	52	.....	.....	.....	.....	.....	.....	.....	.....	.....	J. W. Budlong.
103	60	102	50	96	45	84	16	70	— 2	53	10	120	Dr. N. E. Ballou.
103	49	100	47	91	35	84	9	68	— 2	54	9	125	Dr. M. D. Ewell.

Table of maximum and minimum temperature and

Stations.	Character of station.	January.		February.		March.		April.		May.		June.	
		Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
		°	°	°	°	°	°	°	°	°	°	°	°
Illinois—Continued.													
Springfield	S. S.	61	—18	65	0	71	18	84	26	86	47	96	51
Sterling	S. W. S.	40	—24	.....	.....	50	6	70	20	82	47	.....	.....
Sumner	S. W. S.	66	—14	72	12	76	16	90	28	90	56	98	56
Sycamore	V. O.	43	—24	46	— 8	65	10	83	22	91	43	95	53
Three Mile	S. W. S.	58	—12	72	10	82	28	.....	.....	88	51	.....	.....
Toulon	S. W. S.	53	—26	52	— 9	68	3	83	16	86	42	92	49
Vandalia	S. W. S.	60	—18	.....	.....	70	19	.....	.....	88	52	98	48
Virden	S. W. S.	56	—24	64	— 2	72	22	86	20	86	50	98	48
Wataska	S. W. S.	56	—28	58	0	70	12	88	20	92	42	96	48
White Hall	S. W. S.	58	—20	64	2	68	20	86	26	84	52	90	58
Windsor	V. O.	60	—19	69	2	70	17	86	23	92	47	100	51
Woodstock	S. W. S.	40	—24	45	—10	64	— 1	86	16	.....	.....	99	46
Indiana:													
Angola	S. W. S.	56	—16	55	0	55	8	82	20	100	46	98	47
Blue Lick	S. W. S.	.....	.....	70	11	73	15	84	30	89	56	95	55
Brookville	S. W. S.	63	—14	65	16	68	19	.....	.....	89	51	92	51
Butlerville	V. O.	66	—13	71	15	76	20	90	28	93	59	96	56
Columbia City	S. W. S.	57	—22	56	2	61	10	77	18	89	46	92	50
Columbus	S. W. S.	59	— 8	60	14	70	15	82	26	86	54	96	52
Connersville	S. W. S.	62	—11	62	11	69	18	84	26	86	54	90	54
Degonia	S. W. S.	65	— 5	74	18	70	18	85	23	85	52	93	52
Delphi	S. W. S.	62	—26	58	5	.....	.....	90	22	86	51	96	52
Farmland	S. W. S.	62	—20	62	10	66	14	86	26	84	50	.....	.....
Franklin	S. W. S.	63	—11	63	13	70	23	84	26	88	53	94	58
Greenfield	S. W. S.	.....	.....	62	11	68	18	85	25	.....	.....	.....	.....
Indianapolis	S. S.	64	—12	66	10	70	16	85	22	89	49	94	49
Jeffersonville	V. O.	62	— 5	72	19	74	19	86	23	87	53	95	51
Laconia	V. O.	63	— 6	62	18	75	16	92	18	90	58	100	50
La Fayette	V. O.	62	—33	63	1	69	14	86	20	90	42	94	48
Logansport	V. O.	64	—27	60	6	72	13	88	22	91	50	97	52
Marengo	S. W. S.	63	— 6	72	20	78	24	90	19	92	56	96	56
Marion	S. W. S.	56	—25	59	7	57	15	.....	.....	76	48	96	55
Mauzy	V. O.	60	—17	63	8	67	13	83	21	86	42	90	39
Mount Vernon	S. W. S.	.....	.....	.....	.....	58	21	83	32	90	52	98	52
Muncie	S. W. S.	60	—22	57	12	68	21	85	27	90	54	90	52
Princeton	S. W. S.	63	—12	72	15	72	20	88	20	92	51	98	54
Richmond	S. W. S.	63	—13	58	11	67	15	84	25	84	52	94	58
Rockville	S. W. S.	.....	.....	.....	.....	.....	.....	85	.....	87	50	95	54
Salem	S. W. S.	62	— 7	69	15	71	20	83	26	85	57	.....	.....
Spiceland	S. W. S.	.....	.....	.....	.....	67	13	.....	.....	89	47	93	46
Sunman	V. O.	60	—13	62	8	66	14	88	24	90	52	90	50
Terre Haute	S. S.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	95	47
Vevay	V. O.	64	— 7	70	16	76	18	89	28	90	48	95	51
Worthington	S. W. S.	64	—13	66	14	74	16	87	28	88	53	94	55
Indian Territory:													
Fort Gibson	M. P.	73	—19	75	11	80	25	92	32	93	49	98	55
Fort Reno	S. S.	72	— 6	80	1	84	24	94	30	99	39	95	54
Do	M. P.	73	— 9	79	3	84	22	93	27	95	38	96	54
Fort Sill	S. S.	76	0	72	8	86	26	95	35	93	42	97	60
Fort Supply	S. S.	74	—13	79	— 2	85	24	93	31	94	44	98	58
Do	M. P.	75	—23	80	— 5	85	31	94	26	92	35	95	53
Iowa:													
Bancroft	V. O.	35	—27	40	—22	60	— 8	86	12	95	34	93	40
Cedar Rapids	V. O.	40	—24	50	—10	72	6	80	9	88	40	97	42
Do	V. O.	40	—32	49	—15	71	4	.....	14	90	35	.....	.....
Clinton	V. O.	46	—35	52	—13	71	0	87	18	94	38	103	50
Cresco	V. O.	33	—32	39	—25	62	0	80	13	92	40	93	50
Davenport	S. S.	50	—26	55	—10	70	9	82	16	90	44	97	51
Des Moines	S. S.	42	—24	54	—15	72	10	87	18	93	39	94	45
Do	V. O.	50	—34	56	—24	73	5	83	17	95	37	94	42
Dubuque	S. S.	42	—32	51	—12	70	2	83	16	90	41	96	45
Fort Madison	V. O.	54	—21	55	—10	71	16	86	22	89	46	98	53
Humboldt	V. O.	42	—28	.....	.....	.....	.....	.....	.....	.....	.....	91	44
Independence	V. O.	38	—28	42	—16	61	11	74	17	84	44	90	53
Keokuk	S. S.	55	—18	60	— 7	72	19	84	22	89	48	95	50
Logan	V. O.	46	—26	60	—18	76	18	94	22	96	34	100	46
Monticello	V. O.	43	—32	50	—21	70	— 5	84	13	91	40	97	42
Mount Vernon	V. O.	45	—26	47	—17	73	6	87	20	96	44	100	53
Muscatine	V. O.	45	—30	48	—11	74	7	84	16	89	41	98	41
Oskaloosa	V. O.	40	—27	54	—16	74	10	89	20	94	45	96	55
Do	V. O.	42	—24	50	0	73	14	83	22	94	48	96	57
Kansas:													
Allison	V. O.	62	—23	74	—13	88	11	96	28	98	39	106	56
Brookville	S. W. S.	68	—17	73	— 8	83	24	98	34	.....	.....	109	48
Buffalo Park	S. W. S.	52	—14	70	—15	75	21	93	35	.....	.....	102	65

annual range of temperature, etc.—Continued.

July.		August.		September.		October.		November.		December.		Annual range.	Authority.
Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.		
°	°	°	°	°	°	°	°	°	°	°	°	°	
100	58	97	49	96	37	84	20	77	4	56	—10	118	
.....	.....	.....	.....	.....	.....	70	15	71	2	51	—16	.....	Second Ward School.
108	60	102	54	98	34	86	24	78	— 2	56	— 2	122	J. A. Fyffe.
101	40	101	42	91	28	82	13	65	— 1	48	—12	125	Roswell Dow.
100	58	102	54	98	42	82	20	.....	.....	54	1	.....	W. B. Anderson.
97	55	97	45	90	29	.....	.....	72	— 7	49	—13	.....	Edwin Butler.
102	60	101	51	93	37	80	23	71	9	55	3	.....	Jose Urbani.
104	60	100	46	100	36	82	20	60	4	56	—10	128	A. C. Gish.
105	47	106	45	94	28	82	15	75	1	46	—10	134	Henry Upsall.
98	66	98	58	94	40	.....	.....	75	8	54	— 4	.....	P. J. Bates.
106	52	102	48	95	33	82	20	75	4	56	— 6	125	A. H. Hatch.
102	41	101	40	85	28	.....	.....	.....	.....	43	—17	.....	George D. Silliman.
102	56	101	47	91	32	79	18	64	9	58	— 4	118	L. Stealy.
102	68	101	55	94	43	79	28	.....	.....	.....	.....	.....	G. Poindexter.
103	66	104	44	95	32	82	25	70	1	56	1	.....	A. W. Butler.
106	70	104	57	97	35	82	26	77	1	59	— 4	119	Jos. Hole.
97	56	95	53	90	30	.....	.....	71	5	52	— 5	.....	Dr. N. I. Kithcart.
104	66	103	54	95	34	79	24	68	6	56	1	112	J. A. Perry.
99	69	100	56	91	33	80	22	70	1	52	— 3	111	R. Hessler.
99	65	99	54	94	40	80	28	73	3	57	4	104	Jas. P. White.
104	63	99	53	91	32	82	20	71	0	50	— 8	.....	Higginbotham & Son.
103	60	98	56	90	32	72	20	66	2	52	0	.....	W. J. Davisson.
104	69	101	52	94	37	80	23	72	0	52	— 2	115	D. A. Owen.
.....	.....	99	58	91	36	82	21	.....	.....	.....	.....	.....	A. P. Boots, Dr. S. S. Boots.
101	59	99	49	93	34	82	23	74	4	57	— 3	113	
101	61	99	52	94	38	84	26	72	8	59	4	110	Jno. C. Loomis.
105	71	105	60	99	39	84	21	78	0	60	3	111	Lafe Crosier.
105	53	102	47	95	29	83	19	74	1	55	— 9	138	Purdue University.
104	57	103	47	96	34	86	22	72	6	59	— 5	131	Thos. B. Helm.
105	65	103	52	98	37	85	28	80	5	59	6	111	J. M. Johnson.
105	65	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	S. R. Fankboner.
101	58	98	40	92	25	78	14	69	— 5	55	— 5	118	E. Kirkwood.
100	60	100	51	97	38	82	26	70	6	55	4	.....	J. M. Lockwood.
99	61	94	46	93	29	75	20	69	0	54	1	121	F. E. Huston, A. L. Michener.
103	67	103	60	97	39	83	28	75	— 4	58	1	115	Elisha Jones.
101	66	96	50	92	30	79	22	67	0	55	— 2	114	J. M. Gluys.
102	61	101	55	92	36	75	28	70	12	60	— 4	.....	A. C. Bates.
98	69	96	60	89	41	78	25	73	— 1	59	0	.....	James W. May.
102	58	97	46	91	29	80	22	69	1	57	— 4	.....	Wm. Dawson.
102	62	100	48	92	30	80	22	72	0	55	— 4	115	B. F. Ferris.
102	57	99	50	93	34	80	22	74	5	60	— 2	.....	
105	61	101	46	95	36	86	24	76	5	57	2	112	Prof. Chas. G. Boerner.
100	68	97	55	93	32	80	25	75	— 7	52	— 2	113	Dr. W. B. Squire.
109	62	106	56	95	48	90	26	82	7	.....	.....	.....	United States post hospital.
104	63	104	52	96	44	90	30	83	12	66	— 2	110	
105	47	106	52	97	45	89	28	83	1	66	— 2	115	Do.
105	66	104	56	96	48	89	31	76	8	68	8	105	
99	66	101	53	94	42	90	25	83	— 5	70	Zero	114	
101	61	104	55	97	38	92	20	84	— 1	60	—10	127	Do.
95	46	95	38	88	32	79	— 3	72	—24	38	—20	122	H. N. Renfrew.
99	51	98	42	90	30	80	11	70	—14	50	—17	123	H. D. Olds.
.....	.....	.....	.....	93	32	84	8	72	—26	.....	.....	.....	Prof. Frederick Starr.
104	49	102	41	92	30	86	14	70	— 3	51	—20	139	Luke Roberts.
98	55	99	45	86	35	78	3	67	—25	37	—25	131	Gregory Marshall.
99	56	98	46	93	42	83	46	71	42	54	17	125	
102	52	101	46	92	40	83	14	73	— 9	50	—13	126	
100	52	102	43	93	38	*73	*10	75	—15	57	—16	136	Adolphus Voegeli.
101	55	99	44	88	38	85	15	72	—12	50	—16	133	
100	65	100	47	95	36	83	17	68	4	46	—11	121	Miss L. A. McCreedy.
97	45	100	34	89	30	75	8	78	—23	39	—22	.....	Florence Prouty.
94	62	90	50	81	38	75	18	65	—16	44	—16	122	E. F. Wülfke.
100	69	100	48	96	36	84	20	76	7	57	—11	118	
105	50	103	46	93	36	82	8	75	—16	45	—16	131	J. T. Stern.
100	52	100	38	88	31	82	8	70	—19	46	—19	132	H. D. Smith.
.....	.....	102	52	93	39	86	13	70	—12	41	—19	.....	Prof. Alonzo Collin.
104	52	102	40	98	37	86	14	70	— 1	43	—14	134	J. P. Walton.
100	61	99	46	93	41	83	13	72	—14	47	—16	127	O. H. Avey.
103	64	102	56	93	40	.....	.....	70	—10	.....	.....	.....	Joseph Boyd.
106	60	108	41	.....	.....	.....	.....	.....	.....	.....	.....	.....	John J. Case.
.....	.....	.....	.....	103	44	95	20	82	— 6	60	— 4	.....	F. Coulton.
.....	.....	.....	.....	100	40	90	10	84	—20	65	10	.....	E. C. Moore, E. M. Smith.

Table of maximum and minimum temperature and

Stations.	Character of station.	January.		February.		March.		April.		May.		June.	
		Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
Kansas—Continued.		°	°	°	°	°	°	°	°	°	°	°	°
Bunker Hill	S. W. S.	60	—15	65	—10	85	18	100	38	.....	.....	105	63
Carneiro	S. W. S.	.....	.....	70	— 9	80	18	90	28	.....	.....	100	56
Collyer	S. W. S.	.....	.....	72	—11	96	18	89	34	.....	.....	100	62
Concordia	S. S.	60	—19	72	—15	82	18	93	20	95	36	97	46
Dodge City	S. S.	73	—17	75	— 8	80	17	91	24	95	35	102	55
Dorrance	S. W. S.	68	—16	74	— 6	82	18	90	28	.....	.....	106	60
El Dorado	V. O.	69	—21	73	— 3	81	20	92	25	94	37	96	46
Ellis	S. W. S.	62	—14	64	— 6	72	22	90	36	.....	.....	98	58
Ellsworth	S. W. S.	62	—18	54	— 8	74	18	94	28	.....	.....	104	60
Emporia	V. O.	60	—18	71	— 8	82	20	85	27	92	43	95	47
Eustis	S. W. S.	70	—20	68	—16	84	14	91	31	92	36	100	55
Globe	V. O.	60	—24	64	—10	78	21	86	24	90	48	94	58
Gorham	S. W. S.	.....	.....	68	— 8	82	20	96	32	.....	.....	98	65
Grainfield	S. W. S.	60	—13	65	— 5	78	10	90	28	.....	.....	100	56
Grinnell	S. W. S.	.....	.....	68	—12	86	14	96	20	.....	.....	108	60
Hays City	S. W. S.	72	—20	62	— 4	85	18	94	35	.....	.....	102	56
Hays, Fort	M. P.	75	—28	69	—15	84	5	93	13	97	23	98	41
Independence	V. O.	68	—18	73	0	79	26	92	27	91	46	96	47
Kanopolis	S. W. S.	.....	.....	70	— 2	80	18	90	28	.....	.....	99	60
Lawrence	V. O.	.....	.....	68	— 5	81	22	87	25	92	46	96	51
Leavenworth	S. S.	60	—16	68	— 6	84	20	87	26	90	45	96	51
Lebo	V. O.	69	—25	74	—10	83	22	93	22	98	35	102	45
Manhattan	V. O.	55	—24	64	—10	82	22	89	23	96	40	98	54
Do	V. O.	62	—23	72	— 9	83	23	94	53	99	37	97	54
Monument	S. W. S.	62	—20	66	—16	72	10	88	30	.....	.....	102	60
Morse	V. O.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Ninnescah	V. O.	72	—20	78	— 9	86	21	95	24	96	34	101	56
Oakley	S. W. S.	68	—10	66	—10	81	20	96	36	.....	.....	100	58
Ogallah	V. O.	62	—10	70	— 4	82	20	94	38	.....	.....	104	58
Quintner	S. W. S.	.....	.....	.....	.....	.....	.....	94	34	.....	.....	103	51
Riley, Fort	M. P.	58	—25	68	—10	81	19	93	21	98	36	100	48
Rome	S. W. S.	70	—19	75	— 3	82	15	94	27	94	40	96	50
Russell	S. W. S.	60	—20	60	—10	77	20	.....	.....	.....	.....	99	63
Salina	V. O.	48	—11	75	—10	61	31	97	24	79	54	103	57
Sedan	S. W. S.	73	—13	79	1	82	27	92	30	91	46	94	58
Sheridan	S. W. S.	.....	.....	70	—10	90	12	100	30	.....	.....	108	50
Topeka	S. S.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	100	47
Do	S. W. S.	68	—22	62	— 7	.....	.....	88	24	97	39	100	47
Victoria	S. W. S.	70	—15	60	— 5	72	20	88	40	.....	.....	100	48
Wa Keeney	S. W. S.	68	—13	68	— 9	77	20	98	30	.....	.....	100	60
Wakefield	V. O.	64	—16	64	— 8	75	23	98	31	100	48	102	62
Wellington	V. O.	63	—20	73	— 3	85	15	95	26	95	37	99	54
West Leavenworth	V. O.	54	— 6	60	0	76	23	90	27	93	44	97	53
Wilson	V. O.	.....	.....	68	— 7	74	20	94	22	97	30	101	44
Winona	V. O.	65	—16	84	18	90	24	.....	.....	.....	.....	102	52
Yates Center	V. O.	69	—22	66	— 2	82	20	88	25	96	41	90	51
Kentucky:													
Bowling Green	V. O.	.....	.....	.....	.....	75	22	c 85	c 35	89	55	97	60
Frankfort	V. O.	67	— 5	74	17	75	16	88	16	91	48	98	46
Harper's Ferry	V. O.	.....	.....	68	16	78	20	82	30	86	54	90	58
Louisville	S. S.	67	— 5	78	19	79	8	87	30	90	54	96	53
Midway	V. O.	64	— 3	71	18	71	17	84	17	86	50	96	46
Louisiana:													
Grand Coteau	V. O.	75	17	81	40	81	39	88	46	89	59	90	63
Liberty Hill	V. O.	71	23	72	38	75	49	86	59	90	58	92	.....
New Orleans	S. S.	78	21	82	44	81	44	87	48	91	62	91	66
Shreveport	S. S.	76	12	78	34	84	35	96	39	99	53	101	66
Maine:													
Bar Harbor	V. O.	52	—15	50	— 4	48	— 1	65	19	79	34	91	40
Belfast	N. E. M. S.	47	—16	40	— 3	46	1	61	26	79	46	88	50
Cornish	V. O.	48	—17	42	—10	48	— 4	70	14	84	42	91	50
Eastport	S. S.	50	—13	47	— 4	40	— 2	66	20	74	36	74	42
Fairfield	N. E. M. S.	46	—30	.....	.....	45	—23	64	4	85	34	92	40
Gardiner	V. O.	45	—23	45	—21	47	—10	66	10	88	35	88	41
Kent's Hill	V. O.	43	—19	42	—12	47	— 9	64	14	85	39	89	41
Lewiston	N. E. M. S.	45	—21	44	—24	50	—14	68	10	85	36	91	44
Mayfield	N. E. M. S.	.....	.....	.....	.....	.....	.....	67	.....	84	34	92	49
Orono	V. O.	44	—29	45	—25	44	—14	64	4	86	36	92	47
Petit Manan	N. E. M. S.	.....	.....	34	1	.....	.....	59	23	60	38	74	41
Portland	S. S.	47	—15	42	— 2	46	zero	70	22	87	41	89	43
Maryland:													
Baltimore	S. S.	65	7	72	21	57	21	85	30	87	51	94	52
Cumberland	V. O.	60	— 6	62	14	60	18	82	26	91	50	90	50
Edgartown	S. S.	52	zero	50	10	52	15	73	23	80	39	80	48
Fallston	V. O.	58	1	67	16	53	16	83	26	86	52	89	54

annual range of temperature, etc.—Continued.

July.		August.		September.		October.		November.		December.		Annual range.	Authority.
Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.		
°	°	°	°	°	°	°	°	°	°	°	°	°	
....	....	....	....	102	45	90	22	81	— 7	62	— 8	.....	F. D. Sperry.
....	....	....	....	95	43	92	20	80	—10	....	....	.....	W. H. Boyle.
....	....	....	....	100	42	90	18	90	—18	65	— 4	.....	E. M. Crozier, R. W. Hobert.
102	57	101	52	94	40	92	21	82	—15	53	—10	121	
99	58	102	51	96	38	92	22	80	—13	60	— 9	119	
....	....	....	....	100	48	96	26	84	—10	58	— 8	.....	W. H. Sweet.
99	58	101	53	96	43	....	....	77	— 4	....	....	.....	H. C. Ford.
....	....	....	....	94	50	90	26	70	—10	....	....	.....	F. E. Call.
....	....	....	....	95	48	96	30	80	— 9	60	— 4	.....	R. L. Logan, A. D. Maggart.
99	58	96	54	92	43	84	31	78	— 6	....	....	.....	Prof. T. H. Dinsmore.
101	57	102	48	100	37	93	14	81	—19	61	—16	.....	Charles E. Bennett.
102	64	100	54	94	46	85	22	76	— 7	56	—18	126	William Featherston.
....	....	....	....	100	54	96	30	85	— 2	57	— 8	.....	R. G. Palmer.
....	....	....	....	96	45	86	20	76	—11	58	—12	.....	
....	....	....	....	101	48	87	20	....	....	61	— 4	.....	F. H. Woomer.
....	....	....	....	100	50	96	30	70	—10	69	0	.....	F. E. Black, T. Gallagher.
105	51	103	41	99	30	98	12	84	—16	60	—15	133	United States post hospital.
105	61	111	54	99	52	89	27	81	3	62	— 7	129	J. M. Altaffer.
....	....	....	....	94	44	90	18	82	—10	....	....	.....	E. M. Crozier, J. L. Morton.
102	56	99	49	94	44	87	26	....	....	....	....	.....	Prof. F. H. Snow.
103	57	100	48	95	43	89	23	80	— 4	62	—10	118	
105	52	....	....	99	44	92	22	87	— 3	....	....	.....	C. W. Burnett.
104	60	....	....	96	42	93	19	82	— 9	56	—11	.....	C. B. Blachley.
....	40	101	52	....	....	....	....	....	....	....	....	.....	Prof. E. B. Cowgill.
....	....	....	....	98	42	82	10	72	—20	56	—10	.....	J. W. Edwards.
98	60	98	54	92	44	72	20	78	— 8	58	—12	.....	R. P. Edginton.
105	61	108	54	96	45	94	16	84	— 9	56	— 7	128	E. Shaw.
....	....	....	....	98	52	92	22	78	—18	60	—12	.....	C. M. Kaufman.
....	....	....	....	100	46	92	26	80	— 2	58	— 4	.....	Blanche Marshall.
....	....	....	....	98	45	88	18	82	—17	58	— 9	.....	
105	53	102	50	94	42	90	19	78	— 8	52	—10	130	United States post hospital.
104	63	109	53	98	45	90	26	78	— 3	59	— 4	.....	D. M. Adams.
....	....	....	....	91	40	90	24	71	—16	50	— 4	.....	A. E. Floyd, W. J. Hillyer.
103	68	102	56	84	55	76	33	62	11	43	3	114	John H. Gibson.
108	68	106	60	97	51	90	33	83	8	66	5	.....	John W. Goodell.
....	....	....	....	93	34	94	17	88	—18	....	....	.....	H. G. Adams, W. H. Parker.
104	53	104	46	97	41	90	22	82	— 5	58	— 9	.....	
104	53	104	46	97	41	90	22	82	— 5	58	— 9	.....	Central Station.
....	....	....	....	96	56	80	30	78	—10	54	— 5	.....	W. L. Holt.
....	....	....	....	98	50	89	27	81	— 9	....	....	.....	C. H. Hay.
108	65	104	55	97	47	91	23	80	— 8	53	— 8	124	William P. Cochrane.
104	62	105	52	95	43	90	24	80	— 3	58	5	125	John H. Wolfe.
104	60	100	50	94	49	87	26	80	0	....	....	.....	Dr. W. B. Carpenter.
105	56	103	51	97	40	94	17	82	—14	55	—10	.....	E. Dollinmayer.
....	....	....	....	96	32	88	18	78	—12	60	— 8	.....	J. S. Adams.
102	57	102	48	102	43	88	22	82	0	62	—11	124	F. R. Gray.
102	72	100	61	102	45	82	37	74	17	....	....	.....	M. H. Crump.
103	57	103	44	96	34	86	20	75	1	63	3	108	E. C. Went.
102	73	96	62	....	....	....	....	....	....	....	....	.....	E. G. Harper.
102	65	99	55	94	42	84	26	75	8	60	4	107	
....	....	....	....	....	....	....	....	....	....	....	....	.....	Dr. M. E. Poynter.
91	70	93	67	93	56	86	36	78	30	70	29	76	Rev. C. M. Widman, S. J.
94	73	92	79	90	68	....	....	....	....	....	....	.....	E. A. Crawford, M. D.
96	70	94	71	94	60	86	42	80	34	77	29	75	
104	69	102	66	100	54	91	38	80	26	74	20	92	
91	50	83	47	76	38	66	26	60	14	53	— 6	106	Joseph Wood.
88	61	80	55	74	41	63	30	59	9	49	— 6	104	L. H. Murch.
92	61	87	50	77	36	69	24	61	6	51	— 3	109	Silas West.
84	49	78	49	72	37	64	36	57	4	50	—10	97	
94	51	85	42	78	30	67	21	57	— 3	46	— 9	.....	H. M. Mansfield.
91	54	81	46	75	35	70	25	59	8	50	— 4	114	Rev. Charles L. Wells.
....	....	....	....	74	34	65	22	56	4	50	—10	.....	W. C. Strong.
94	56	85	47	80	32	68	24	59	5	50	— 5	118	Union Water Power Company.
91	52	....	....	74	29	63	16	54	— 6	....	....	.....	V. P. Hall.
93	56	84	45	77	31	66	21	60	5	51	—10	122	Prof. M. C. Fernald.
82	56	78	50	....	....	64	28	51	10	....	....	.....	G. L. Upton.
96	57	86	48	75	26	69	28	64	8	55	— 2	111	Signal Service.
102	67	91	55	88	42	85	32	69	25	59	16	94	
98	60	88	48	82	36	76	24	70	16	50	12	104	E. T. Shriver.
88	74	83	60	75	41	66	34	61	26	57	11	88	
97	64	87	52	83	38	82	29	66	22	56	11	96	Prof. G. G. Curtiss.

Table of maximum and minimum temperatures and

Stations.	Character of station.	January.		February.		March.		April.		May.		June.	
		Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
		°	°	°	°	°	°	°	°	°	°	°	°
Maryland—Continued.													
Great Falls	V.O.	64	2	68	13	58	20	82	31	88	54	96	56
McDonogh	V.O.	62	2	66	11	56	17	81	26	85	48	89	48
McHenry, Fort	M.P.	53	8	57	20	64	19	82	30	80	50	91	55
Mount Saint Mary's		60	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
New Midway	V.O.	66	— 2	66	12	58	19	84	25	90	55	94	50
Woodstock	V.O.	63	1	69	10	56	15	84	25	89	42	93	44
Massachusetts:													
Amherst	V.O.	47	—22	44	4	46	— 2	74	17	86	33	91	38
Do	V.O.	48	—12	46	— 1	48	2	72	19	89	34	89	39
Blue Hill (base)	V.O.	53	—12	50	0	50	6	80	21	88	39	90	42
Blue Hill (summit)	V.O.	52	—11	50	0	50	6	79	19	87	42	90	45
Boston	S.S.	56	— 5	48	5	53	10	80	23	89	45	89	48
Cambridge	V.O.	52	—11	45	3	48	7	75	22	87	30	90	44
Do	N.E.M.S.	55	— 7	47	5	50	9	75	22	88	39	90	44
Chestnut Hill	N.E.M.S.	54	—14	46	1	50	5	76	22	88	36	90	42
Concord	N.E.M.S.	54	—16	51	0	53	8	81	20	91	33	98	38
Cotuit	N.E.M.S.	52	— 4	52	7	52	11	73	22	80	36	84	43
Dalton	N.E.M.S.	56	—14	46	— 2	52	— 2	70	18	88	46	88	52
Deerfield	N.E.M.S.	50	—24	50	— 8	48	— 3	70	12	88	32	91	40
Do	V.O.	46	—21	52	— 8	52	— 3	70	20	90	44	91	49
Dudley	V.O.	50	—11	43	— 1	48	5	80	18	87	40	92	43
Fall River	V.O.	55	— 3	50	5	50	11	80	26	85	41	88	43
Do	N.E.M.S.	.....	.....	.....	.....	.....	.....	.....	.....	86	39	88	45
Fitchburg	N.E.M.S.	51	—13	47	— 1	47	6	72	22	86	42	90	47
Do	N.E.M.S.	53	—13	49	0	50	7	74	24	89	44	88	49
Framingham	N.E.M.S.	56	—24	58	— 1	50	7	79	20	90	31	94	41
Gilbertville	N.E.M.S.	50	—13	45	— 1	53	4	.....	.....	.....	.....	89	41
Groton	N.E.M.S.	62	— 9	49	— 6	53	2	74	17	87	34	90	39
Do	N.E.M.S.	54	—14	50	0	52	4	78	18	88	34	.....	39
Heath	V.O.	56	—12	44	0	46	0	70	12	86	40	92	48
Lake Cochituate	N.E.M.S.	55	—25	52	— 7	54	— 2	84	16	91	31	95	38
Lawrence	N.E.M.S.	52	—25	47	— 1	50	0	80	17	90	35	98	41
Long Plain	N.E.M.S.	56	— 8	50	0	54	14	80	24	83	44	88	48
Lowell	N.E.M.S.	62	—16	58	— 2	.....	.....	76	20	.....	45	87	51
Do	N.E.M.S.	52	—26	48	— 1	48	— 1	75	20	87	36	93	43
Ludlow	N.E.M.S.	48	—22	45	4	56	1	75	18	87	31	91	36
Lynn	N.E.M.S.	51	— 5	46	4	47	9	76	23	82	41	83	46
Manchester	N.E.M.S.	.....	.....	.....	.....	.....	.....	.....	.....	77	42	78	47
Mansfield	N.E.M.S.	.....	.....	52	1	54	8	81	20	87	32	90	38
Middleborough	N.E.M.S	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	90	38
Milton	V.O.	59	—13	50	1	52	13	78	23	86	40	89	32
Monson	V.O.	55	—17	50	— 7	52	4	76	18	88	32	90	38
Nantucket	S.S.	54	5	52	14	52	6	67	25	77	42	79	47
Do	V.O.	54	2	51	12	52	13	72	25	81	39	85	46
New Bedford	V.O.	52	— 5	48	4	50	14	76	21	80	39	85	44
Do	N.E.M.S.	51	— 8	51	0	55	9	81	22	83	33	85	40
Newburyport	V.O.	55	—15	48	2	51	5	78	22	88	39	92	44
Northampton	N.E.M.S.	47	—23	48	— 3	47	2	72	19	87	39	93	39
Plymouth	N.E.M.S.	58	— 5	50	6	57	16	79	27	89	45	92	52
Princeton	N.E.M.S.	.....	.....	.....	.....	43	0	70	14	83	38	88	44
Randolph	N.E.M.S.	54	—10	50	2	56	8	76	22	88	.....	90	42
Rowe	N.E.M.S.	53	—12	46	— 6	46	0	60	16	84	44	86	47
Salem	N.E.M.S.	52	—12	45	1	.....	.....	78	24	87	45	90	51
Somerset	V.O.	59	— 8	52	0	57	12	82	22	89	38	94	44
South Boston	N.E.M.S.	55	—10	51	4	50	6	80	25	91	40	90	48
South Hingham	N.E.M.S.	.....	—16	.....	1	.....	7	.....	16	.....	30	.....	36
Springfield	N.E.M.S.	49	— 8	46	2	49	8	75	21	90	42	92	44
Taunton	V.O.	58	— 7	54	3	59	11	87	23	88	35	95	41
Do	V.O.	58	— 7	54	4	58	11	83	22	86	36	93	40
Do	N.E.M.S.	58	—11	54	— 4	58	8	83	16	86	30	92	36
Warwick	N.E.M.S.	57	—20	44	— 7	.....	.....	.....	.....	.....	.....	.....	.....
Wellesley	N.E.M.S.	54	—22	56	— 5	50	1	80	19	89	32	93	40
Westborough	V.O.	56	—22	50	3	53	10	80	18	91	34	95	40
Williamstown	V.O.	57	—17	49	0	42	0	66	13	82	35	83	40
Wood's Holl	S.S.	.....	.....	.....	.....	.....	.....	.....	.....	75	42	76	47
Michigan:													
Adrian	S.W.S.	.....	.....	.....	.....	55	9	78	20	.....	.....	.....	.....
Alma	W.S.	.....	.....	.....	.....	47	.....	74	14	90	41	92	42
Alpena	S.S.S.	47	—16	48	—15	45	— 8	75	9	83	35	88	44
Athens	S.W.S.	.....	.....	.....	.....	60	2	82	12	93	35	98	45
Benton Harbor	V.O.	47	—12	54	0	64	6	82	25	83	50	91	52
Big Rapids	S.W.S.	.....	.....	.....	.....	.....	.....	69	11	89	34	93	43

annual range of temperature, etc.—Continued.

July.		August.		September.		October.		November.		December.		Annual range.	Authority.
Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.		
°	°	°	°	°	°	°	°	°	°	°	°	°	
103	66	98	50	88	43	85	30	70	22	60	13	101	Watchman.
95	64	90	53	82	42	79	29	67	20	56	12	93	McDonogh Institute.
98	68	89	56	84	42	83	31	66	16	65	15	90	U. S. Post Hospital.
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	Mount Saint Mary's College.
104	61	90	45	84	34	85	26	70	22	56	14	106	Geo. F. Smith.
98	58	89	45	85	34	80	25	67	20	56	12	97	Woodstock College.
94	56	88	42	80	30	74	17	65	11	51	— 6	116	Massachusetts Experimental Station.
94	53	86	43	79	31	73	17	64	9	52	— 2	106	Miss S. C. Snell.
92	58	84	48	79	36	74	20	68	10	60	6	104	Prof. A. L. Rotch.
91	57	83	47	77	36	72	23	66	7	56	1	102	Do.
95	61	86	52	80	40	73	27	69	12	59	5	100	
93	60	84	51	79	37	70	26	66	18	56	3	104	Harvard College Observatory.
95	60	87	46	80	36	.....	.....	67	6	58	5	.....	E. C. Brooks.
92	57	86	47	80	32	72	24	67	16	58	— 1	106	Boston Water-Works.
99	57	89	43	80	31	73	19	67	16	59	2	115	J. O. Haskell.
88	56	86	48	75	34	70	27	64	20	54	5	92	J. H. Reed.
90	62	86	47	76	36	.....	.....	65	8	54	— 2	.....	O. B. Hayes.
92	59	88	42	81	29	74	18	64	10	49	— 9	116	Rev. A. Hasen.
95	63	92	50	83	32	76	19	66	10	49	— 6	116	J. Childs.
97	48	93	41	80	33	76	21	65	12	57	— 1	108	Conant Observatory.
89	62	87	49	74	38	75	26	65	10	57	7	92	C. V. S. Remington.
91	59	90	48	77	36	74	25	68	4	59	3	.....	P. Kieran.
94	59	85	50	80	39	72	24	64	8	52	1	107	J. Fisher.
91	60	84	51	78	39	71	24	65	10	52	0	104	A. P. Mason.
97	57	88	45	80	29	77	19	68	14	58	— 3	121	Boston Water-Works.
100	54	.....	.....	78	29	72	16	63	8	54	0	.....	W. E. Brown.
94	58	86	46	80	34	73	18	64	10	58	— 2	103	F. F. Waters, C. Woolley.
.....	.....	.....	.....	80	31	77	26	69	5	.....	.....	.....	R. B. Potter, M. Hall, J. Binney.
96	56	90	42	80	36	72	20	58	14	50	4	108	B. B. Cutler.
96	51	91	40	84	26	78	14	70	10	58	— 6	121	Boston Water-Works.
97	55	92	44	80	31	72	23	66	10	55	— 2	123	Essex Company.
93	54	90	50	82	33	74	26	64	16	54	3	101	New Bedford Water-Works.
94	64	85	53	80	40	72	25	65	17	54	2	.....	Lowell Water-Works.
93	58	88	48	80	35	72	22	66	18	53	1	119	Proprietors Locks and Canals.
91	52	88	41	78	28	77	15	65	10	50	— 4	113	M. W. Graves.
89	59	83	48	78	36	70	26	62	6	56	5	94	D. Walden.
88	60	82	52	74	42	72	28	.....	.....	.....	.....	.....	T. J. Coolidge.
93	56	86	44	79	28	75	19	65	12	55	3	.....	J. H. White.
92	53	88	43	79	28	75	21	68	12	58	2	.....	Middleborough Water-Works.
95	59	85	49	79	36	72	23	67	13	60	4	108	Rev. A. K. Teele.
92	57	90	43	80	26	74	15	65	8	55	— 2	109	G. E. Fuller.
84	58	83	53	72	47	67	39	.....	28	58	13	79	
87	60	89	50	78	42	72	34	62	26	55	11	87	H. Paddock.
91	55	86	49	75	38	73	26	63	13	56	5	96	T. R. Rodman.
91	55	85	46	76	35	74	24	64	17	58	6	99	New Bedford Water-Works.
98	58	86	46	81	36	72	26	69	13	58	1	113	F. V. Pike.
94	62	90	48	81	33	73	20	64	10	52	— 4	117	J. M. Clark.
93	65	90	57	79	43	77	30	68	19	59	6	98	Miss L. B. Knapp.
88	54	84	45	78	34	73	22	62	4	54	0	.....	Mrs. J. O. West, M. Grimes.
96	56	.....	.....	.....	.....	78	22	64	6	55	2	.....	F. C. Granger.
90	58	86	46	78	34	72	20	61	4	46	— 6	102	J. Davis.
98	63	83	53	79	39	68	25	63	17	56	3	.....	J. P. Andrews.
99	62	96	48	84	38	82	24	69	16	60	3	107	Elisha Slade.
96	60	88	52	82	38	.....	.....	.....	.....	.....	.....	.....	D. Reeves.
.....	53	.....	40	.....	29	.....	23	.....	12	.....	1	.....	H. W. Cushing.
94	62	89	48	80	32	76	20	65	12	50	2	102	E. C. Wheeler.
94	57	90	47	83	32	77	25	69	14	58	5	102	E. W. Jones.
96	56	90	47	81	32	77	25	69	14	59	5	103	A. F. Sprague.
93	54	88	41	79	28	80	19	68	12	58	4	104	Taunton Water-Works.
.....	.....	81	42	75	31	70	18	62	6	47	— 6	.....	H. T. Lyche.
93	57	.....	.....	80	29	74	17	68	11	56	3	.....	Miss S. F. Whiting.
99	60	95	46	84	32	76	18	72	14	63	4	121	Boston Water-Works.
88	56	83	42	78	32	67	21	64	8	.....	.....	.....	
82	59	82	55	75	49	66	34	61	20	56	8	.....	
101	59	98	48	89	33	78	19	66	9	56	— 8	.....	W. H. Howard.
97	39	97	39	.....	.....	73	12	65	10	54	— 5	.....	P. M. Smith.
91	44	93	40	82	28	75	15	64	7	54	6	109	
101	49	100	40	90	28	.....	.....	.....	.....	.....	.....	.....	E. H. Coller, M. D.
100	52	95	45	.....	.....	.....	.....	.....	.....	.....	.....	.....	A. J. McClave.
.....	.....	96	37	80	24	74	10	64	4	50	— 6	.....	F. R. Fowler.

Table of maximum and minimum temperature and

Stations.	Character of station.	January.		February.		March.		April.		May.		June.	
		Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
Michigan—Continued.		°	°	°	°	°	°	°	°	°	°	°	°
Birmingham	V. O.	49	—17	51	— 4	49	3	73	15	96	39	102	49
Brady, Fort	M. P.	38	—29	30	—24	44	—24	64	0	88	33	90	38
Calumet	S. W. S.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Cassopolis	S. W. S.	.....	.....	.....	.....	64	6	81	19	90	42	91	47
Central Mine	S. W. S.	.....	.....	.....	.....	.....	.....	.....	.....	93	38	95	38
Charlevoix	S. W. S.	.....	.....	.....	.....	.....	.....	.....	.....	94	27	96	37
Detroit	S. S.	54	— 3	54	1	52	7	72	18	87	45	88	50
Escanaba	S. S.	39	—24	36	—18	44	—12	57	8	77	32	80	43
Ganges	S. W. S.	.....	.....	.....	.....	63	4	79	19	89	38	90	50
Gaylord	S. W. S.	.....	.....	.....	.....	.....	.....	.....	.....	90	28	92	40
Grand Haven	S. S.	48	— 2	46	— 7	60	7	73	16	84	42	84	48
Grand Rapids	S. W. S.	.....	.....	.....	.....	56	7	78	16	96	41	98	49
Greenville	S. W. S.	.....	.....	.....	.....	55	0	74	14	90	38	95	44
Harrisville	V. O.	45	—17	48	—21	45	— 5	71	10	90	30	94	40
Hart	S. W. S.	.....	.....	.....	.....	.....	.....	.....	.....	89	28	96	44
Hastings	S. W. S.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	90	45
Hudson	V. O.	52	—23	50	4	56	10	82	16	91	39	92	41
Jonesville	S. W. S.	.....	.....	.....	.....	58	6	79	18	85	41	88	48
Kalamazoo	V. O.	45	— 9	53	2	55	11	76	18	84	45	87	51
Lansing	S. S.	50	—14	54	1	56	8	75	19	90	45	91	49
Do	V. O.	48	—20	53	— 3	50	5	77	16	90	41	90	46
Mackinaw City	S. S.	42	—14	41	—12	40	—10	69	9	83	32	79	44
Marshall	V. O.	52	—15	44	10	56	4	80	18	.....	.....	94	49
Marquette	S. S.	37	—21	36	—13	46	—14	82	9	88	33	91	40
Mottville	V. O.	51	—26	50	4	54	— 2	80	22	88	42	88	55
Mount Morris	S. W. S.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Olivet	S. W. S.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	88	48
Ovid	S. W. S.	.....	.....	.....	.....	49	— 1	75	15	88	39	91	47
Petersburgh	S. W. S.	.....	.....	.....	.....	.....	.....	.....	.....	91	45	95	39
Port Huron	S. S.	49	— 9	53	1	46	4	74	17	89	40	88	48
Romeo	S. W. S.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	88	49
Saint John's	S. W. S.	.....	.....	.....	.....	48	2	76	13	90	43	92	49
Saint Louis	S. W. S.	.....	.....	.....	.....	49	4	74	14	92	44	93	48
Saginaw	S. W. S.	.....	.....	.....	.....	46	5	74	18	88	46	92	43
Sand Beach	S. W. S.	.....	.....	.....	.....	.....	.....	.....	.....	82	41	86	42
Snowflake	S. W. S.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Swartz Creek	V. O.	53	—25	53	—10	50	— 3	76	15	93	37	94	41
Thornville	V. O.	52	—22	54	— 8	48	3	76	20	93	44	92	50
Traverse City	V. O.	39	—15	46	—15	48	— 7	69	14	97	34	98	43
Minnesota:													
Albert Lea	S. W. S.	35	—40	38	—26	55	— 6	84	10	88	33	92	44
Delano	S. W. S.	.....	.....	.....	.....	.....	.....	84	11	88	34	90	42
Duluth	S. S.	34	—28	44	—23	53	—13	80	7	80	35	83	36
Excelsior	S. W. S.	31	—36	42	—32	51	—12	.....	.....	89	45	89	48
Mankato	S. W. S.	33	—32	43	—21	50	— 4	84	12	89	38	88	44
Minneapolis	V. O.	28	—34	42	—28	47	—12	80	15	88	40	93	51
Moorhead	S. S.	30	—48	39	—35	46	—19	86	4	96	25	95	36
Morris	S. W. S.	27	—39	41	—32	46	—16	88	8	90	30	91	38
Northfield	S. W. S.	32	—37	42	—28	48	—10	83	12	88	38	92	43
Park Rapids	S. W. S.	35	—46	42	—41	.....	.....	*82	*9	.....	.....	93	34
Pine River Dam	S. W. S.	.....	.....	.....	.....	*48	*—12	83	10	90	34	96	48
Pokegama Falls	S. W. S.	.....	.....	.....	.....	.....	.....	.....	.....	86	26	87	32
Red Wing	S. W. S.	36	—35	43	—26	52	— 6	81	14	87	39	90	46
Rolling Green	S. W. S.	.....	.....	.....	.....	.....	.....	80	10	88	41	87	52
Saint Paul	S. S.	32	—36	43	—27	54	— 7	84	14	91	37	90	48
Saint Vincent	S. S.	23	—42	28	—38	45	—27	84	— 4	96	25	93	34
Sherburne	S. W. S.	33	—32	39	—24	52	—10	88	10	96	34	94	51
Snelling, Fort	M. P.	32	—42	42	—32	52	—13	84	14	91	38	92	47
Winona	S. W. S.	38	—36	.....	.....	61	2	*80	*12	*90	*40	.....	.....
Mississippi:													
Artonish Plantation	S. W. S.	76	16	81	38	80	40	88	44	94	58	.....	.....
Batesville	S. W. S.	70	2	72	28	72	31	83	32	89	54	93	54
Biloxi	V. O.	65	21	73	36	74	40	80	42	83	64	84	67
Edwards	S. W. S.	73	9	79	38	86	32	90	38	93	52	98	60
Greenville	S. W. S.	77	9	79	35	87	37	93	38	91	55	97	61
Hermanville	S. W. S.	.....	.....	.....	.....	*78	*32	92	40	93	64	101	69
Palo Alto	V. O.	.....	.....	.....	31	78	28	90	41	90	56	98	65
Starkville	S. W. S.	.....	.....	.....	.....	.....	.....	84	34	89	55	89	55
University	S. S.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	99	57
Vicksburg	S. S.	76	10	80	38	80	37	92	43	91	58	97	64
Waynesborough	S. W. S.	.....	.....	80	28	79	31	93	34	94	51	99	55
West Point	S. W. S.	74	8	80	32	80	36	86	40	90	68	94	64

annual range of temperature, etc.—Continued.

July.		August.		September.		October.		November.		December.		Annual range.	Authority.
Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.		
°	°	°	°	°	°	°	°	°	°	°	°	°	
.....	.....	.....	.....	89	29	77	16	62	10	.....	.....	.....	S. Alexander.
90	41	96	38	85	27	62	31	56	— 3	48	— 6	119	U. S. post hospital.
86	46	90	45	80	36	62	16	62	3	37	— 1	.....	E. S. Grierson.
98	54	97	44	87	33	78	20	65	9	52	— 6	.....	H. J. Webb.
.....	.....	90	37	82	31	64	14	62	0	54	—10	.....	E. T. W. Daume.
96	40	94	40	84	31	77	20	63	12	47	12	.....	E. F. Parmalee.
101	54	93	49	90	34	75	22	64	16	55	7	104	
86	44	82	38	80	29	68	11	65	— 7	42	— 6	110	
97	49	95	39	83	31	80	19	.....	.....	.....	.....	.....	Edward Hawley.
95	37	92	22	85	26	75	4	59	3	45	3	.....	Dr. J. Robinson, F. A. Baldwin.
90	52	91	46	82	32	76	20	59	13	53	5	98	
.....	.....	.....	.....	86	30	76	17	64	14	52	5	.....	F. M. Kendall.
96	46	95	41	84	27	72	12	64	10	56	4	.....	Sprague Brothers.
101	39	90	38	87	29	78	10	63	8	.....	.....	.....	D. W. Mitchell.
101	47	98	32	86	28	81	28	68	10	56	5	.....	F. H. Edwards.
97	52	95	40	84	28	74	12	64	12	52	1	.....	John Bessner, F. R. Timmerman.
97	45	100	38	80	24	81	14	58	7	43	— 8	123	Maj. A. H. Boies.
95	50	96	46	86	33	79	19	64	12	53	1	.....	R. S. Munsell, R. N. Coryell.
98	58	92	53	84	41	75	23	64	12	53	2	107	William A. Black.
100	52	94	45	86	34	75	20	63	16	54	1	114	
96	45	93	39	87	27	72	13	65	10	54	— 3	116	Dr. H. B. Baker.
89	48	88	46	76	32	75	20	62	6	49	7	103	
102	52	94	53	87	38	77	22	67	15	54	— 2	.....	W. F. Drake.
97	46	89	41	82	33	77	12	64	— 5	42	4	117	
96	55	98	46	89	32	76	17	67	7	56	—14	124	J. A. Hartzler.
102	42	99	38	86	30	75	12	65	9	56	2	.....	Dr. H. H. Bardwell.
96	49	92	43	84	28	74	15	64	11	53	— 2	.....	Olivet College.
.....	.....	.....	.....	.....	.....	71	14	63	13	54	0	.....	W. H. Faxon.
99	50	98	40	89	29	82	18	66	10	58	— 2	.....	S. L. Jones.
99	53	92	44	89	32	77	20	60	12	52	6	108	
97	50	92	48	83	33	75	22	68	14	53	8	.....	O. D. Thompson.
98	55	97	43	86	30	71	16	66	12	55	4	.....	Devit H. and A. O. Hunt.
98	45	95	42	83	28	72	18	65	12	54	2	.....	B. H. Scoville.
.....	.....	.....	.....	.....	.....	.....	.....	65	13	54	6	.....	W. H. Sherzer.
97	51	89	42	89	32	76	16	67	10	60	6	.....	N. P. Arnold.
97	43	93	39	89	29	78	19	61	9	48	6	.....	W. W. Johnson.
100	41	98	37	.....	.....	.....	.....	.....	.....	.....	.....	.....	George G. Gordon, M. D.
98	51	96	43	90	33	80	20	70	13	.....	.....	.....	John S. Caulkins, M. D.
104	45	94	38	87	27	78	13	63	10	50	6	119	S. E. Wait.
97	47	95	41	85	34	77	— 6	.....	.....	.....	.....	.....	President R. B. Abbott.
94	44	92	36	84	32	69	8	68	—29	38	—32	.....	A. W. Wittman.
95	52	94	46	86	36	65	8	65	—15	44	—17	123	
94	59	93	49	82	44	.....	.....	66	—23	36	—30	.....	Dr. James R. Walker.
90	48	92	42	85	34	75	8	70	—22	39	—26	.....	Prof. H. P. Cushing.
96	51	92	45	83	37	67	12	63	—20	39	—22	130	William Cheney.
96	42	84	37	84	23	74	6	72	—22	36	—36	144	
98	48	91	33	83	25	69	6	74	—20	34	—34	.....	D. T. Wheaton.
93	47	94	48	81	33	74	3	68	—28	40	—29	.....	M. D. Sneider.
[f]98	[f]40	89	30	.....	.....	[e]72	[e]0	68	—32	.....	.....	.....	P. A. Walling, M. D.
101	58	94	38	88	30	70	8	70	—36	37	—46	.....	N. McKay and N. Johnson.
[e]92	[e]37	82	30	78	19	72	4	.....	.....	33	.....	.....	Olof Johnson.
92	49	92	41	83	36	72	7	67	— 2	43	—24	.....	Prof. O. Whitman.
91	54	88	40	84	33	73	8	62	—20	37	—25	.....	Capt. F. Wherland.
94	51	91	41	83	34	72	12	70	—20	41	—22	130	
89	38	88	29	85	18	71	—10	69	—30	43	—44	140	
100	58	96	40	92	30	76	2	74	—22	38	—22	.....	J. Peacock.
95	48	96	37	83	30	73	9	70	—25	37	—18	138	U. S. post hospital.
.....	.....	.....	.....	.....	.....	[f]78	[f]5	65	—19	.....	.....	.....	Prof. J. M. Holtzinger.
.....	.....	.....	.....	.....	.....	.....	.....	80	26	80	25	.....	B. P. Swan, H. H. Swan.
98	64	99	57	97	50	84	30	71	16	.....	.....	.....	H. Harris.
98	71	90	71	88	59	84	37	72	30	67	28	77	Dr. R. G. Hinsdale.
98	69	99	70	97	49	88	31	72	26	.....	.....	.....	C. W. Barber.
.....	.....	95	64	93	55	83	37	.....	.....	.....	.....	.....	W. M. Green, jr.
102	70	100	71	99	54	89	36	78	24	73	23	.....	M. B. Herman.
99	73	97	64	99	54	88	33	80	20	62	16	.....	W. H. Hill.
.....	.....	96	66	82	44	.....	.....	76	16	62	18	.....	George L. Donald.
98	67	99	60	99	50	85	31	74	17	64	16	.....	
95	68	95	64	96	52	88	34	81	27	73	22	87	
99	68	98	61	99	48	86	30	.....	.....	.....	.....	.....	W. G. Southall.
94	74	98	66	91	[e]66	90	32	80	22	64	15	90	J. H. L. Gerdine.

Table of maximum and minimum temperature and

Stations.	Character of station.	January.		February.		March.		April.		May.		June.	
		Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
		°	°	°	°	°	°	°	°	°	°	°	°
Missouri:													
Conception	V. O.	47	—24	59	—16	75	17	83	29	89	43	92	48
Fayette	V. O.	60	—16	71	— 1	78	16	88	20	92	49	.....	.....
Houstonia	S. W. S.	64	—17	68	— 3	78	19	86	25	90	50	93	50
Ironton	S. W. S.	51	—10	70	— 5	75	14	82	20	82	48	87	40
Kirksville	S. W. S.	56	—22	61	— 8	74	14	84	22	92	46	94	50
Lamar	S. S.	68	—18	72	— 3	77	23	86	24	87	47	91	50
Louisiana	S. W. S.	57	—22	71	— 2	78	14	89	24	92	46	100	42
Mexico	S. W. S.	56	—21	63	— 2	73	21	84	26	90	52	96	56
Miami	S. W. S.	58	—18	70	— 4	76	18	90	26	93	50	100	50
Mound City	S. W. S.	46	—24	57	— 9	.....	.....	.....	.....	95	42	98	48
Oregon	S. W. S.	51	—19	63	—13	79	15	88	25	91	41	.....	.....
Saint Louis	S. S.	66	—10	74	4	79	23	87	32	89	51	97	57
Saint Louis (central station).	S. W. S.	62	—15	72	— 8	79	26	86	33	86	52	96	56
Sedalia	S. W. S.	65	—19	72	— 6	80	18	88	24	92	49	99	53
Springfield	S. W. S.	68	—10	73	7	77	23	89	28	89	50	92	54
Do	V. O.	50	—11	72	5	74	17	90	22	87	45	88	45
Steelville	S. W. S.	68	—18	.....	.....	80	21	88	30	90	45	96	44
Troy	S. W. S.	.....	.....	.....	.....	80	23	86	24	.....	.....	98	48
Montana:													
Assinaboine, Fort	S. S.	43	—35	46	—55	60	—15	79	21	92	29	87	37
Custer, Fort	S. S.	47	—30	51	—34	72	— 2	82	25	92	32	103	39
Helena	S. S.	48	—25	61	—40	67	4	74	22	88	31	83	33
Keogh, Fort	M. P.	49	—50	48	—49	67	4	85	19	91	34	107	42
Maginnis, Fort	S. S.	47	—26	56	—42	69	— 3	76	18	88	26	84	33
Missoula, Fort	M. P.	42	— 9	54	—19	61	11	70	30	85	39	82	40
Poplar River	S. S.	42	—40	43	—45	58	—12	87	12	99	29	101	39
Shaw, Fort	M. P.	49	—34	56	—46	72	4	77	18	92	31	86	33
Nebraska:													
Brownsville	V. O.	50	—20	62	—14	79	19	89	26	98	39	95	54
Crete	V. O. & S. S.	.....	.....	64	—14	80	11	88	18	94	34	93	45
De Soto	V. O.	63	—23	54	—15	78	9	93	22	97	33	96	48
Fremont	V. O.	50	—22	55	—12	75	9	88	23	92	35	93	46
Genoa	V. O.	46	—27	60	—17	77	5	91	21	92	38	95	45
Hay Springs	V. O.	50	—23	57	—24	75	6	85	15	86	28	92	39
Lincoln	V. O.	55	—22	59	—15	79	10	88	21	94	37	.....	.....
Marquette	V. O.	52	—24	54	—18	78	7	93	20	94	36	94	58
Niobrara, Fort	M. P.	51	—30	59	—24	81	— 8	95	17	94	32	97	40
North Platte	S. S.	56	—21	59	—16	78	10	93	18	93	31	94	46
Omaha	S. S.	51	—22	59	—16	78	10	88	23	93	39	91	49
Robinson, Fort	M. P.	54	—25	59	—25	76	2	88	18	88	30	95	39
Sidney, Fort	M. P.	61	—17	66	—13	78	8	85	15	88	28	99	43
Tecumseh	V. O.	49	—18	56	—13	70	—18	88	30	96	30	90	50
Valentine	S. S.	50	—30	56	—22	73	6	89	14	88	22	94	40
Yutan	V. O.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Nevada:													
Battle Mountain	R. R.	60	8	58	12	74	26	82	30	96	30	96	36
Beowawe	R. R.	57	10	55	11	76	31	84	29	95	30	96	50
Browns	R. R.	60	11	54	9	75	25	85	34	98	43	103	52
Carlin	R. R.	58	2	52	4	74	22	80	30	99	33	100	46
Carson City	V. O.	61	8	50	—11	74	4	82	22	101	22	98	33
Elko	R. R.	52	— 2	51	— 2	70	20	83	30	105	32	104	40
Golconda	R. R.	72	12	58	10	75	32	89	31	105	37	105	48
Halleck	R. R.	58	— 6	52	—18	.....	.....	87	24	100	28	100	48
Hawthorne	R. R.	62	26	52	18	80	30	88	34	98	36	98	36
Hot Springs	R. R.	62	—12	58	— 6	70	4	74	34	88	48	96	38
Humboldt	R. R.	57	8	55	8	75	30	82	40	97	42	92	40
McDermit, Fort	M. P.	49	9	42	4	70	25	79	17	97	17	95	31
Otego	R. R.	40	— 6	42	0	64	12	80	20	84	32	.....	.....
Palisade	R. R.	54	0	50	8	68	28	80	32	98	38	100	47
Reno	R. R.	60	12	56	—11	64	0	68	28	96	26	93	40
Tecoma	R. R.	50	5	54	12	74	30	80	28	98	34	98	50
Toano	R. R.	52	— 2	52	0	70	28	80	28	96	30	94	30
Wadsworth	R. R.	64	10	56	4	74	10	84	30	98	38	102	50
Wells	R. R.	51	4	50	4	70	26	72	29	94	32	90	50
Winnemucca	S. S.	57	8	51	1	75	18	81	22	96	17	98	30
Do	R. R.	60	10	53	5	82	24	84	32	98	20	99	38
New Hampshire:													
Berlin Mills	V. O.	56	—33	48	—30	50	—10	70	— 9	94	25	94	38
Concord	V. O.	.....	.....	.....	.....	.....	.....	78	15	94	36	92	40
Do	V. O.	49	—19	50	— 8	57	— 4	77	14	92	37	89	41
Dover	V. O.	48	.....	43	— 4	50	0	72	22	90	46	92	50
Grafton	N. E. M. S.	50	—25	50	—14	50	—13	.....	.....	87	.....	90	42
Hanover	N. E. M. S.	45	—33	45	—16	44	—14	62	4	85	32	89	43
Manchester	S. S.	.....	.....	.....	.....	49	4	79	18	89	35	93	41
Do	N. E. M. S.	51	—21	46	— 7	49	— 5	80	15	90	33	92	37

annual range of temperature, etc.—Continued.

July.		August.		September.		October.		November.		December.		Annual range.	Authority.
Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.		
°	°	°	°	°	°	°	°	°	°	°	°	°	
98	65	98	53	90	30	83	22	74	2	55	—12	122	Rev. M. Eckstine.
.....	.....	103	42	100	34	92	18	82	5	58	—11	.....	T. Berry Smith.
99	56	100	50	.....	.....	.....	.....	.....	.....	.....	.....	.....	S. J. Spurgeon.
93	56	94	46	90	28	78	18	74	6	54	— 4	104	W. H. Delano.
102	56	102	49	94	40	84	22	78	0	56	—14	124	Charles Patterson.
99	60	98	48	93	43	87	22	78	5	61	— 5	117	
106	55	104	46	102	29	89	19	81	0	57	— 9	128	M. J. Hassler.
108	63	106	50	101	35	85	20	77	3	59	—11	199	J. F. Llewellyn.
103	56	104	50	96	40	86	20	.....	.....	.....	.....	.....	A. W. Sullivan.
.....	.....	.....	.....	.....	.....	80	21	78	— 8	57	—15	.....	Lawrence Kaucher.
101	54	101	48	93	42	87	24	80	—10	58	—15	.....	Mrs. William Kaucher.
100	68	99	52	97	45	86	24	79	10	58	— 2	110	
99	70	98	54	96	48	85	29	77	13	57	— 2	114	Maurice Johnson, G. A. Weber.
104	59	103	47	.....	.....	88	21	78	1	.....	.....	.....	C. G. Taylor.
99	65	98	52	94	46	88	21	78	9	59	— 5	109	E. F. Copp.
.....	.....	.....	.....	.....	.....	.....	.....	79	.8	64	— 5	.....	E. M. Shepard, T. S. Collins.
102	61	100	46	95	31	85	19	76	8	60	— 8	.....	E. A. Pinnell.
104	64	104	50	100	34	88	22	78	8	60	— 6	.....	L. A. Ward.
93	43	89	42	84	33	77	— 3	71	—30	52	—30	148	
98	44	94	41	87	34	85	—15	72	—20	58	—20	137	
92	44	87	40	81	32	74	3	66	—11	51	—13	132	
103	40	100	41	90	38	88	— 5	70	—24	53	—24	157	U. S. post hospital.
91	42	89	40	85	28	77	—11	69	—13	[b]54	—[b]14	133	
88	46	91	44	80	29	67	8	54	— 3	52	— 6	110	Do.
97	42	94	39	89	27	80	— 2	70	—34	43	—29	146	
96	39	91	40	89	27	79	— 9	66	—29	55	—25	132	Do.
106	50	104	52	96	42	86	22	80	—12	50	—16	126	George D. Carrington.
103	53	101	46	94	40	90	16	80	—17	50	—15	.....	Prof. Goodwin D. Sweeey.
105	51	103	48	93	36	84	11	77	—14	45	—14	128	Charles Seltz.
101	59	100	51	89	35	84	11	76	—16	47	—11	123	Isaac E. Heaton.
98	55	95	46	90	40	79	11	79	—27	50	—18	125	George S. Truman.
99	47	98	44	87	31	85	2	70	—26	46	—28	127	W. M. Waterman.
.....	.....	.....	.....	.....	.....	89	15	80	—15	49	— 6	.....	University of Nebraska.
100	58	97	48	92	39	87	14	75	—22	46	—18	124	John Ellis.
101	50	99	47	91	30	93	4	79	—32	55	—26	133	U. S. post hospital.
99	54	100	47	94	30	85	9	81	—25	56	—18	125	
103	55	102	48	92	39	81	16	80	—14	48	—14	125	
99	60	97	45	92	31	88	1	77	—19	52	—26	125	Do.
103	50	96	30	93	34	90	0	78	—21	59	—17	124	Do.
105	55	99	53	92	39	83	20	75	—14	50	—14	123	W. L. Dunlap.
97	38	96	38	93	32	87	3	75	—32	52	—29	129	
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	A. F. Bryant.
98	54	96	40	.....	.....	85	20	76	— 9	50	0	.....	Pacific Railroad system.
95	61	93	45	87	40	85	20	70	— 5	47	— 8	104	Do.
105	68	100	45	88	50	88	30	72	8	.....	.....	.....	Do.
100	58	97	40	91	36	90	16	66	0	48	—18	118	Do.
98	40	93	33	86	31	88	19	70	4	58	— 4	112	Charles W. Friend.
106	60	107	44	92	38	80	22	69	—14	49	—12	121	Pacific Railroad system.
106	65	105	45	95	45	90	25	85	10	65	12	96	Do.
102	54	102	30	92	28	90	10	60	—27	48	—22	.....	Do.
98	60	92	50	92	42	90	38	68	28	56	20	80	Do.
106	54	98	58	80	41	80	28	68	6	70	6	118	Do.
98	54	92	44	86	41	82	30	78	10	50	10	90	Do.
96	43	92	33	88	29	82	18	76	5	47	9	93	U. S. post hospital.
88	64	[d]88	[d]62	.....	.....	.....	.....	.....	.....	.....	.....	.....	Pacific Railroad system.
98	55	96	59	86	39	78	13	69	— 9	49	— 8	109	Do.
96	45	84	38	69	34	72	32	68	15	54	12	109	Do.
105	60	98	56	98	58	86	22	65	10	44	8	100	Do.
94	56	92	44	83	44	74	22	58	6	46	8	98	Do.
100	64	96	46	90	44	86	28	72	8	58	9	98	Do.
96	46	88	40	82	32	74	28	50	—19	27	—22	118	Do.
95	44	93	26	88	28	87	18	71	— 4	48	1	102	
99	40	95	47	90	39	90	37	74	6	55	8	94	Do.
100	53	89	33	81	21	69	16	69	19	49	—13	133	Q. A. Bridger.
95	56	86	46	81	30	.....	.....	.....	.....	.....	.....	.....	A. L. Downing.
93	56	83	45	79	32	70	22	72	16	57	— 2	112	W. L. Foster.
100	64	85	52	82	37	78	24	64	12	55	— 2	.....	G. W. Caswell.
96	.....	89	43	83	24	.....	.....	65	4	45	— 9	.....	P. R. Kimball.
.....	.....	86	42	78	28	64	19	59	14	43	—20	.....	C. S. Cook.
93	56	88	46	80	32	72	24	69	7	56	— 3	.....	
94	51	88	43	83	30	72	20	68	14	55	— 4	115	S. D. Lord, C. F. Chase.

Table of maximum and minimum temperature and

Stations.	Character of station.	January.		February.		March.		April.		May.		June.	
		Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
New Hampshire—Continued.		°	°	°	°	°	°	°	°	°	°	°	°
Manchester	N. E. M. S.	48	—26	43	— 7	45	—10	72	17	87	34	92	40
Mount Washington	S. S.	37	—35	33	—26	32	—26	42	— 8	62	16	67	33
Nashua	V. O.	53	—25	47	— 5	51	— 6	79	18	91	32	94	39
Do	N. E. M. S.	53	—28	47	— 8	48	— 8	75	15	90	34	96	40
Quincy	N. E. M. S.	44	—20	42	—15	44	—10	60	— 6	86	30	93	40
Shelburne	N. E. M. S.	35	—27	42	—24	61	—23	66	—14	90	27	93	41
Stratford	N. E. M. S.	44	—31	50	—23	55	—21	70	— 5	91	31	95	38
Walpole	N. E. M. S.	48	—14	48	— 8	54	— 2	76	14	84	38	89	43
West Milan	N. E. M. S.	48	—38	50	—33	50	—33	72	— 1	86	26	92	35
New Jersey:													
Atlantic City	S. S.	49	7	58	17	56	18	84	27	73	47	95	54
Beverly	V. O.	63	4	67	15	55	21	83	29	87	52	94	56
Billingsport Lighthouse.	S. W. S.	64	6	68	18	54	21	78	31	86	48	90	56
Bordentown	S. W. S.	66	3	66	13	54	18	86	22	91	42	94	48
Clayton	V. O.	67	5	67	14	57	19	87	26	92	43	94	49
Dover	V. O.	56	— 4	60	6	49	12	81	20	90	35	92	42
Egg Harbor City	V. O.	67	4	68	10	61	8	84	25	90	40	92	44
Elizabeth	S. W. S.	.....	.....	66	14	52	14	84	23	86	42	91	46
Gillette	S. W. S.	60	0	54	8	52	10	83	16	87	42	93	42
Hanover	S. W. S.	.....	.....	.....	.....	52	13	81	20	89	35	90	42
Harrisville	S. W. S.	.....	.....	68	10	61	8	84	21	92	39	94	45
Imlaystown	S. W. S.	66	3	67	4	52	11	82	25	90	43	95	47
Lambertville	S. W. S.	.....	.....	62	13	54	20	82	28	86	47	90	54
Locktown	S. W. S.	58	0	60	10	50	12	82	24	86	41	91	47
Lakewood	V. O.	67	8	54	18	60	20	77	29	86	44	.....	.....
Matawan	S. W. S.	59	8	57	18	60	18	82	30	94	42	.....	.....
Moorestown	V. O.	65	2	67	16	50	20	81	26	86	43	92	56
New Brunswick	S. W. S.	60	6	63	16	50	19	79	29	83	48	88	51
Do	S. W. S.	59	2	62	10	50	16	82	25	86	39	90	47
Do	S. W. S.	62	4	64	13	55	16	83	23	88	42	[b]95	[b]46
Newark	S. W. S.	60	6	63	13	50	17	80	30	88	46	92	54
Ocean City	S. W. S.	[a]57	[a]1	56	21	52	24	79	29	78	50	92	54
Oceanic	S. W. S.	.....	.....	.....	.....	.....	.....	81	28	90	47	95	54
Do	S. W. S.	.....	.....	69	16	51	18	77	32	.....	48	95	50
Paterson	V. O.	60	4	66	13	52	14	80	30	91	43	97	50
Princeton	S. W. S.	59	4	63	13	50	17	82	26	86	44	.....	.....
Rancocas	S. W. S.	65	2	66	14	.....	18	84	26	88	50	92	53
Readington	V. O.	68	6	64	14	60	20	86	30	88	50	96	56
Roseland	V. O.	58	10	61	2	49	12	82	19	86	36	.....	.....
Salem	V. O.	63	4	69	17	57	24	86	31	90	53	94	58
Somerville	S. W. S.	60	4	62	14	54	17	81	26	85	42	90	47
South Orange	V. O.	60	8	62	14	52	16	82	27	86	50	90	54
Tenafly	S. W. S.	54	1	60	1	52	12	82	18	93	36	96	52
Union	S. W. S.	58	5	61	13	48	17	79	29	85	50	88	54
Vineland	V. O.	64	6	67	14	56	18	72	18	84	43	92	45
New Mexico:													
Bayard, Fort	M. P.	76	17	74	15	86	25	87	27	92	36	97	53
Deming	R. R.	80	12	84	20	96	38	94	42	95	54	104	68
Gallinas	V. O.	59	3	61	25	75	31	82	33	82	37	87	55
Lava	S. S.	65	12	69	12	[d]84	[d]21	89	31	97	35	103	46
Lordsburgh	R. R.	.....	.....	73	26	80	38	85	38	93	46	99	59
Santa Fé	S. S.	56	6	62	9	67	20	72	23	81	24	86	48
Seldon, Fort	M. P.	73	11	75	39	89	27	95	31	101	34	105	52
Stanton, Fort	S. S.	65	4	67	12	73	14	78	21	84	29	90	43
Union, Fort	M. P.	69	—10	67	3	76	10	76	13	84	31	90	42
Wingate, Fort	M. P.	51	3	59	8	69	20	73	25	83	28	89	44
New York:													
Albany	S. S.	50	—15	43	2	46	4	72	18	87	42	94	52
Auburn	V. O.	53	— 2	45	2	47	13	74	22	84	34	83	49
Brooklyn	V. O.	61	5	63	15	49	19	74	28	87	48	91	52
Do	V. O.	.....	.....	63	13	50	14	79	27	83	43	89	50
Buffalo	S. S.	56	— 2	54	6	51	11	65	19	84	37	86	52
Columbus, Fort	M. P.	56	5	60	15	51	10	.....	.....	86	45	92	53
Cooperstown	V. O.	51	—18	46	— 5	48	— 2	66	13	88	45	83	51
Factoryville	V. O.	55	—12	56	8	57	12	78	20	92	40	90	50
Humphrey	V. O.	52	5	52	— 3	50	14	68	16	88	43	88	51
Ithaca	V. O.	56	—12	50	4	54	10	75	20	88	40	92	48
Le Roy	V. O.	56	— 8	54	3	53	9	72	18	88	42	88	45
Madison Barracks	M. P.	50	—36	48	— 8	45	0	67	17	84	37	82	47
Menand Station	V. O.	46	—14	41	0	42	5	67	23	84	51	87	54

annual range of temperature, etc.—Continued.

July.		August.		September.		October.		November.		December.		Annual range.	Authority.
Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.		
°	°	°	°	°	°	°	°	°	°	°	°	°	
95	53	86	43	79	30	73	20	68	14	51	— 4	121	W. Little.
66	30	64	26	56	18	.....	.....	.....	.....	.....	.....	.....	
97	55	88	42	84	30	74	20	66	7	55	— 2	122	C. H. Webster.
97	51	88	43	82	29	73	19	.....	.....	50	— 5	.....	Nashua Manufacturing Co.
92	52	87	40	78	26	.....	.....	.....	.....	.....	.....	.....	Miss M. H. Dix.
96	50	86	36	86	27	71	15	60	9	48	—11	123	W. F. Carr, A. C. Lary.
97	51	91	38	84	27	74	18	62	— 2	55	—24	128	N. B. Waters.
92	54	88	44	78	33	70	21	64	13	46	—12	106	E. A. Knowlton.
91	50	82	34	80	22	72	12	62	— 5	44	—24	130	A. A. Higgins.
97	65	88	54	78	40	77	34	64	23	56	14	90	
97	69	88	55	86	38	81	28	70	22	59	13	98	Prof. C. F. Richardson.
96	70	87	58	86	45	78	32	68	22	58	16	90	Joseph H. Preston.
100	60	88	49	88	36	82	28	71	22	61	12	97	Dr. M. S. Simpson.
102	62	91	55	89	38	89	28	70	22	59	13	97	William T. Wilson.
96	55	90	43	82	32	82	24	66	18	58	10	100	W. C. Harris.
100	58	91	46	85	36	87	23	71	19	58	10	96	H. Y. Postma.
96	60	90	46	82	35	80	26	71	20	59	11	.....	N. L. Wilson, M. D.
96	58	92	40	85	32	.....	.....	69	18	61	9	.....	R. N. Cornish.
96	54	92	42	84	30	79	21	61	17	59	8	.....	M. M. Cook.
.....	.....	92	46	87	35	85	25	72	18	.....	.....	.....	J. W. Harris.
98	60	89	49	82	35	81	28	70	12	59	12	95	Dr. H. G. Norton.
94	65	87	53	82	41	80	30	68	21	59	14	.....	Dr. G. H. Larison.
93	61	87	48	83	35	82	25	68	19	57	7	96	G. W. Hockenbury.
.....	.....	.....	.....	.....	.....	79	30	70	25	.....	.....	.....	Dr. W. C. Stone.
102	65	93	50	87	43	86	34	71	25	62	11	.....	Prof. J. C. Rice.
98	68	86	50	81	39	84	29	68	22	58	12	96	T. J. Beans.
.....	.....	86	53	82	41	75	30	66	26	58	14	.....	P. V. Spader.
.....	.....	90	49	85	38	79	27	72	21	58	11	.....	Geo. H. Cook, Ph. D., LL. D.
98	60	93	50	84	39	82	26	72	20	58	11	94	Prof. Austin Scott, Ph. D.
.....	.....	92	55	84	42	76	30	.....	.....	57	13	.....	F. W. Ricord.
97	68	90	66	84	45	76	38	68	27	63	16	96	William Lake.
101	67	92	54	92	42	80	34	69	23	59	16	.....	Rev. S. W. Knipe.
.....	.....	.....	51	.....	.....	.....	.....	.....	.....	.....	.....	.....	J. E. Parmly.
94	63	.....	.....	81	39	77	28	67	16	60	16	.....	A. B. Wiggin.
.....	.....	.....	.....	.....	.....	79	27	67	20	58	12	.....	Malcolm McNeill.
.....	.....	.....	53	.....	42	82	30	70	21	58	13	.....	Spencer Haines.
98	72	88	54	84	40	80	28	70	24	62	14	.....	John Fleming.
94	55	89	42	82	30	.....	.....	.....	.....	.....	.....	.....	W. E. Cass.
102	68	94	55	90	41	87	36	66	23	60	14	98	S. L. Richmond.
94	61	88	48	84	37	77	28	68	22	59	12	90	A. C. Lindsley.
96	62	90	55	84	44	78	30	68	24	62	6	90	Dr. W. J. Chandler.
99	56	91	42	85	30	84	20	67	13	58	8	98	Arthur D. Atwood.
93	64	88	56	82	40	77	28	67	20	58	11	88	F. L. Dunbar.
97	64	89	50	83	40	80	30	65	43	59	15	91	Dr. C. H. Adams.
95	59	99	58	95	52	95	38	80	19	74	— 3	102	U. S. post hospital.
110	71	108	64	85	60	90	45	75	30	65	12	98	Pacific Railroad system.
92	60	91	59	86	48	80	29	70	24	58	5	89	John E. Whitman.
102	56	103	56	95	47	90	32	70	18	64	— 3	106	
98	68	99	68	94	57	89	45	72	29	60	2	.....	Pacific Railroad system.
87	51	80	46	80	38	78	31	67	15	46	— 8	95	
108	58	107	58	94	48	98	30	82	21	66	— 4	112	U. S. post hospital.
91	47	90	44	79	40	80	22	69	12	57	—18	109	
92	47	92	45	87	33	81	27	70	20	63	—12	104	Do.
89	50	88	45	82	43	78	26	63	10	45	— 7	96	Do.
95	61	90	48	82	38	71	26	65	11	46	— 1	110	
92	59	85	44	76	37	74	24	67	9	57	— 2	94	George Casey.
96	64	90	55	84	42	76	29	67	24	58	11	91	Prof. W. C. Peckham.
93	66	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	S. A. Dunn.
92	60	94	50	79	36	69	24	64	15	53	6	96	
95	65	90	53	80	42	76	31	65	12	55	14	.....	U. S. post hospital.
90	61	83	44	73	33	72	20	65	4	45	— 4	108	George P. Keese.
99	55	87	39	81	30	78	17	66	12	54	2	111	F. P. Yates.
95	60	92	48	84	30	75	21	62	7	49	2	98	Charles E. Whitney.
95	56	90	42	80	34	78	17	68	5	57	— 5	107	Engineering Dep't, Cornell University.
.....	.....	.....	.....	86	32	76	21	69	14	52	4	.....	Prof. F. M. Comstock.
94	56	93	43	79	35	68	12	68	— 3	49	— 9	130	U. S. post hospital.
90	65	87	51	76	41	68	29	62	10	44	— 2	104	C. B. Tillinghast.

Table of maximum and minimum temperature and

Stations.	Character of station.	January.		February.		March.		April.		May.		June.	
		Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
		°	°	°	°	°	°	°	°	°	°	°	°
New York—Continued.													
New York City	S. S.	63	6	63	17	50	16	80	26	88	47	90	51
Niagara, Fort	M. P.	48	— 4	52	7	54	8	71	18	86	36	88	43
North Volney	V. O.	49	—14	45	0	47	5	73	21	89	45	90	54
Oswego	S. S.	50	—10	47	2	48	6	66	16	87	43	82	45
Palermo	V. O.	44	—18	44	— 2	45	1	66	21	89	41	87	52
Palmyra	V. O.	47	— 7	52	5	58	10	78	25	93	48	91	56
Plattsburgh Bar'cks	M. P.	47	—22	49	—16	46	— 6	66	9	86	38	88	48
Rochester	S. S.	58	— 5	55	5	54	9	72	20	86	40	85	49
Setauket	V. O.	57	4	56	14	54	13	76	26	84	41	89	46
Utica	V. O.	47	—20	44	— 5	54	0	73	15	88	34	90	34
West Point	M. P.	52	— 7	57	5	54	10	78	20	90	37	95	45
White Plains	V. O.	50	— 4	49	12	50	12	76	30	85	49	84	51
North Carolina:													
Chapel Hill	V. O.	72	8	79	22	83	26	91	28	93	45	....	....
Charlotte	S. S.	69	8	71	26	80	27	89	32	91	51	102	53
Hatteras	S. S.	66	20	67	33	69	32	76	37	78	55	83	60
Hot Springs	V. O.	....	....	....	....	....	....	....	....	....	....	90	48
Kitty Hawk	S. S.	b70	b15	75	29	74	26	80	33	89	51	b97	b56
Lenoir	V. O.	62	3	74	25	74	26	93	29	85	51	93	49
Lincolnton	V. O.	63	1	65	27	68	27	75	32	79	54	90	57
Raleigh	S. S.	69	8	72	22	77	24	86	30	90	46	102	50
Do	V. O.	74	6	79	26	81	26	88	34	90	55	97	65
Reidville	V. O.	78	1	....	....	75	12	92	23	96	44	100	48
Southport	S. S.	64	12	69	31	67	29	77	34	84	47	91	54
Statesville (near)	V. O.	65	6	70	23	74	27	87	30	88	51	96	52
Tarborough	V. O.	73	9	75	23	78	24	85	30	90	44	100	51
Wake Forest	V. O.	71	7	75	20	80	20	a87	a27	90	43	....	....
Weldon	V. O.	70	10	74	22	77	29	83	32	91	52	97	54
Wilmington	S. S.	73	15	75	27	82	28	86	33	88	47	98	53
Ohio:													
Akron	S. W. S.	....	....	....	....	....	....	....	....	90	45	90	50
Bangorville	S. W. S.	58	—12	60	5	64	6	83	17	88	45	90	47
Canton	S. W. S.	62	— 6	69	8	63	11	83	19	88	41	89	48
Cincinnati	S. S.	66	— 5	70	15	73	19	84	27	89	53	91	52
Clarksville	S. W. S.	61	— 4	63	13	68	16	83	24	86	49	89	47
Cleveland	S. S.	62	— 6	61	9	63	11	76	19	85	41	87	51
Do	V. O.	62	— 6	61	9	60	14	76	19	86	41	88	51
College Hill	V. O.	70	—16	68	10	79	14	85	28	90	58	96	51
Do	S. W. S.	60	—10	64	10	70	12	85	23	86	48	91	48
Columbus	S. S.	66	— 5	64	13	68	14	83	24	90	50	91	49
Dayton	S. W. S.	62	— 8	64	10	70	14	85	24	88	48	94	47
Elyria	V. O.	62	—15	60	11	63	12	79	13	89	43	90	49
Garrettsville	V. O.	61	—18	60	3	63	4	81	10	90	36	90	42
Georgetown	S. W. S.	65	— 7	69	12	60	14	88	24	93	49	97	48
Greenville	S. W. S.	59	—12	60	9	65	14	82	24	84	48	87	47
Hanging Rock	S. W. S.	66	— 3	69	13	72	15	85	24	90	45	95	49
Hiram	V. O.	62	— 8	59	6	61	7	80	16	88	43	81	48
Jacksonborough	V. O.	60	—12	57	10	66	12	86	22	94	48	101	54
Jefferson	S. W. S.	....	....	58	8	60	9	77	16	87	43	89	50
Logan	S. W. S.	68	—13	66	12	73	12	89	22	93	45	96	48
McConnellsville	S. W. S.	75	— 5	65	11	72	12	87	20	90	43	93	47
Marietta	S. W. S.	67	— 5	66	14	72	12	87	23	88	44	92	50
Napoleon	V. O.	60	—11	58	4	63	10	82	14	90	46	92	49
New Alexandria	S. W. S.	65	— 2	62	9	66	10	86	17	94	41	98	48
New Bremen	S. W. S.	70	—14	68	11	....	....	82	21	....	....	....	....
New Comerstown	S. W. S.	66	— 8	63	9	68	13	83	18	92	40	92	48
North Lewisburgh	V. O.	64	—10	60	8	66	10	86	22	91	48	95	51
Oberlin	S. W. S.	60	—11	57	10	67	10	76	19	86	42	90	50
Paulding	S. W. S.	63	—21	59	1	70	9	89	17	93	38	97	38
Pomeroy	S. W. S.	....	....	65	17	71	16	90	26	97	45	102	48
Portsmouth	V. O.	65	4	70	18	75	18	88	28	88	46	94	54
Quaker City	S. W. S.	62	— 4	62	7	67	6	84	19	88	44	91	46
Ruggles	V. O.	56	— 8	56	10	60	10	83	20	88	47	86	50
Sandusky	S. S.	62	— 8	60	8	62	11	81	19	91	47	91	49
Sidney	S. W. S.	59	—18	62	10	65	15	84	22	90	50	95	47
State University	S. W. S.	65	—10	63	10	70	9	87	19	92	44	94	43
Tiffin	V. O.	60	—11	59	9	64	10	86	12	92	50	95	50
Do	V. O.	59	— 8	59	9	62	12	86	20	94	52	94	54
Toledo	S. S.	60	—10	58	2	60	8	77	18	91	46	92	48
Upper Sandusky	S. W. S.	60	—10	61	8	64	11	84	17	90	47	91	47
Washington C. H.	S. W. S.	64	— 8	64	12	70	14	84	25	88	46	94	44
Wauseon	V. O.	59	—20	56	0	62	7	84	17	92	40	92	45
Waverly	S. W. S.	64	—10	68	5	58	14	84	23	89	41	97	48
Westerville	V. O.	62	—10	60	11	65	11	81	22	88	46	91	44

annual range of temperature, etc.—Continued.

July.		August.		September.		October.		November.		December.		Annual range.	Authority.
Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.		
°	°	°	°	°	°	°	°	°	°	°	°	°	
94	66	88	55	84	41	78	32	67	23	56	12	88	
95	60	99	52	87	36	77	24	68	14	55	12	103	U. S. post hospital.
94	60	92	50	78	40	70	25	68	4	53	— 5	108	J. M. Patrick.
90	58	87	48	79	40	72	24	70	9	52	Zero	100	
95	57	89	45	75	33	69	23	67	0	54	—10	113	E. B. Bartlett.
98	61	91	51	83	39	77	22	70	16	56	1	105	L. D. Cummings.
96	58	88	45	83	34	69	22	62	5	48	—14	118	U. S. post hospital.
95	59	89	44	87	34	76	24	71	16	53	3	100	
90	62	86	55	78	42	74	33	65	24	58	—13	103	S. B. Strong.
103	40	93	28	82	17	83	6	69	7	46	— 4	123	Thomas Birt.
93	57	92	45	84	34	80	28	63	15	55	5	102	U. S. post hospital.
88	69	83	57	78	38	78	28	63	17	50	8	92	Prof. O. R. Willis.
.....	.....	.....	.....	98	36	92	34	76	25	68	14	.....	Prof. J. W. Gore.
102	66	95	53	94	40	84	36	74	22	63	16	94	
89	70	83	65	84	53	80	42	73	39	65	24	69	
91	60	88	49	87	39	79	31	72	12	65	14	.....	Dr. C. F. McGahan.
[c]107	[c]63	[g]97	[g]60	[d]94	[d]44	88	[h]46	72	[h]31	66	[f]19	92	
95	48	84	49	85	41	77	33	67	16	.....	.....	.....	Dr. R. L. Beall.
93	68	88	60	82	39	74	35	64	20	54	19	92	Dr. L. R. Standenmayer.
103	66	92	52	92	40	82	34	71	25	66	15	95	
101	73	91	60	98	43	88	36	76	27	69	16	95	Thomas C. Harris.
103	58	91	59	94	35	.....	.....	.....	.....	.....	.....	.....	Prof. T. J. Norcom.
91	68	90	59	86	40	80	39	70	25	66	20	81	
99	70	88	54	90	40	80	35	70	20	60	16	93	W. A. Eliason.
102	63	93	55	95	40	86	35	76	26	67	17	93	E. V. Zoeller.
102	64	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	Prof. W. G. Simmons.
103	69	94	56	95	40	87	34	73	25	64	14	93	Mr. T. A. Clark.
100	66	95	56	91	42	85	35	74	26	67	19	85	
98	58	95	45	90	35	79	21	64	4	54	4	.....	Prof. C. S. Howe.
97	58	94	46	90	35	80	18	65	1	53	— 2	109	S. M. Painter.
99	54	96	42	88	32	79	18	66	0	56	3	105	C. F. Stokey.
101	63	100	54	93	40	81	26	74	8	59	1	106	
99	60	95	46	91	32	79	21	70	0	56	0	103	E. T. M. Williams.
95	60	94	47	93	36	81	24	67	6	57	5	101	
96	60	94	46	93	36	81	24	67	6	57	5	102	G. A. Hyde.
105	63	106	54	102	40	84	25	60	— 2	56	— 3	122	John W. Hammitt.
99	62	98	50	91	35	80	22	70	1	56	— 4	109	Prof. A. D. Morrill.
100	61	97	42	93	36	83	20	74	3	57	1	105	
102	60	99	43	83	31	81	20	70	— 2	56	— 2	110	Mrs. Edith E. L. Boyer.
100	55	97	44	94	35	84	21	68	0	50	4	115	Charles W. Goodspeed.
99	50	96	37	92	30	81	14	57	— 5	55	4	117	S. M. Luther.
103	62	102	49	98	34	83	21	74	6	55	2	110	Dr. Thomas W. Gordon.
95	58	93	46	88	31	77	22	67	4	55	— 2	107	Charles L. Katzenberger.
100	57	96	44	94	33	82	17	74	7	59	3	103	James Bull.
.....	.....	96	52	90	30	77	21	62	3	53	4	.....	Prof. G. H. Colton.
102	66	102	60	96	36	80	26	72	— 1	58	— 4	114	Dr. J. B. Owsley.
96	55	95	45	92	35	80	20	65	13	54	7	.....	E. C. Wade.
104	60	101	41	97	37	90	15	72	0	58	1	117	Dr. James Little.
102	59	99	42	97	35	83	15	72	4	58	3	107	C. H. Morris.
100	60	96	46	94	38	80	17	74	10	59	5	105	Prof. T. D. Biscoe.
100	53	95	43	89	29	77	22	66	11	52	2	111	Dr. T. C. Hunter.
103	56	98	43	89	31	80	12	71	7	56	3	115	Joseph A. Hook.
105	55	97	42	91	29	79	21	65	2	54	— 5	.....	C. W. Williamson.
.....	.....	.....	41	85	32	.....	15	.....	0	.....	4	.....	Dr. A. M. Beers.
102	58	100	44	94	35	83	20	68	1	58	— 1	112	H. D. Gowey.
98	57	97	44	91	29	.....	.....	.....	2	56	0	.....	Prof. F. T. Jewett.
101	42	99	33	95	23	84	18	66	7	56	— 8	122	Mr. L. E. Hitchcock.
106	60	104	47	97	36	83	18	68	10	58	5	.....	Dr. D. N. Allard.
101	59	96	47	94	35	82	20	75	6	62	6	97	Dr. D. B. Cotton.
100	58	96	41	89	33	80	12	70	4	56	4	104	Joel Hall.
99	58	98	46	90	38	78	20	64	— 4	53	3	107	Peter Bowman.
98	63	97	50	95	42	85	24	69	4	58	1	106	
100	60	97	44	92	31	80	25	69	3	55	0	118	Ed. Pence.
102	54	101	39	92	33	82	16	71	— 8	55	— 1	112	Moses Craig.
102	62	98	45	90	34	.....	.....	.....	.....	.....	.....	.....	R. J. Thompson.
102	66	98	48	92	35	83	25	67	4	52	3	110	Rev. T. H. Sonedecker.
99	52	96	47	93	34	81	21	66	11	58	2	109	
99	57	95	42	91	34	81	22	68	— 1	54	0	109	Dr. A. Billhardt.
.....	.....	101	43	96	33	82	20	.....	.....	55	0	.....	R. H. Morrow.
101	47	100	39	95	25	83	15	68	8	58	— 4	121	Thomas Mikesell.
102	57	.....	.....	95	31	82	12	70	— 2	58	0	.....	H. W. Overman.
.....	.....	.....	.....	.....	.....	80	17	68	— 8	54	— 1	.....	Prof. John Haywood.

Table of maximum and minimum temperature and

Stations.	Character of stations.	January.		February.		March.		April.		May.		June.	
		Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
		°	°	°	°	°	°	°	°	°	°	°	°
Ohio—Continued.													
West Milton	V.O.	65	11	62	12	70	15	90	24	.....	.....	98	53
Wooster	S.W.S.	.....	.....	.....	.....	63	10	85	20	91	44	89	49
Yellow Springs	V.O.	60	−9	62	10	66	13	80	24	86	46	92	45
Youngstown	S.W.S.	63	−11	62	8	66	11	86	18	89	38	92	40
Oregon:													
Albany	V.O.	56	30	56	6	72	31	75	36	98	42	98	50
Ashland	S.S.	59	22	69	12	80	25	83	25	101	27	103	38
Astoria	S.S.	.....	.....	.....	.....	66	30	61	35	86	36	84	46
Bandon	V.O.	56	27	58	18	74	31	60	40	85	44	67	45
Eola	V.O.	54	28	55	6	67	32	66	28	96	32	92	49
East Portland	V.O.	47	30	62	6	72	31	68	30	96	30	90	46
Klamath, Fort	S.S.	49	−3	40	−15	61	15	74	18	89	14	90	26
Do	M.P.	54	−1	39	−16	69	13	76	14	94	12	94	24
Linkville	S.S.	[j]58	[j]16	54	−1	72	23	76	26	93	24	90	25
La Grande	V.O.	45	14	46	−2	66	17	76	26	90	30	86	36
Lakeview	S.S.	51	2	48	−6	64	26	76	18	92	20	92	31
Mount Angel	V.O.	64	27	56	5	67	31	69	30	96	38	97	52
Portland	S.S.	58	29	63	9	75	31	69	31	99	34	95	44
Roseburgh	S.S.	58	23	70	7	81	29	77	28	102	32	97	30
Pennsylvania:													
Altoona	V.O.	62	1	68	16	73	20	80	28	93	46	94	46
Bethlehem	V.O.	53	−2	58	14	50	19	81	28	89	48	94	49
Blooming Grove	V.O.	52	−14	51	2	54	5	74	20	91	49	94	50
Catawissa	V.O.	58	−3	61	12	.....	.....	.....	.....	88	39	89	46
Corry	V.O.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Drifton	V.O.	50	−7	57	4	56	7	78	17	87	36	95	44
Dyberry	V.O.	49	−18	48	−1	53	−4	63	10	89	33	89	40
Erie	S.S.	64	−4	64	8	58	12	72	17	86	43	85	52
Fallsington	V.O.	61	3	58	13	52	20	81	30	84	51	90	54
Franklin	V.O.	44	−12	54	6	54	10	76	10	86	44	87	46
Germantown	V.O.	61	2	63	14	48	20	84	29	85	52	88	58
Grampian Hills	V.O.	54	−12	60	8	58	12	78	18	90	50	92	50
Meadville	V.O.	58	−5	59	9	59	17	.....	.....	.....	.....	88	60
Philadelphia	S.S.	66	8	66	18	54	22	84	28	88	49	93	53
Philipsburgh	V.O.	59	−12	66	3	65	12	76	22	85	51	88	52
Pittsburgh	S.S.	68	4	67	15	68	15	84	24	95	47	94	52
Quakerstown	V.O.	55	1	56	9	47	13	80	22	83	42	87	43
Reading	V.O.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
State College	V.O.	58	−7	63	8	60	11	79	17	88	41	89	45
Wellsborough	V.O.	45	−14	50	8	55	10	76	15	90	40	92	48
Wilkes Barre	V.O.	60	−2	54	10	52	13	83	18	.....	.....	93	45
West Chester	V.O.	62	2	63	14	50	16	82	25	84	45	90	49
Wysox	V.O.	57	−10	47	12	52	12	77	21	86	47	88	56
Rhode Island:													
Block Island	S.S.	56	2	54	12	54	17	67	25	77	44	80	49
Bristol	N.E.M.S.	50	−2	49	6	53	13	71	24	78	41	82	45
Narragansett Pier	S.S.	53	−3	51	6	57	13	77	23	81	40	84	46
Newport	N.E.M.S.	50	0	49	8	51	16	73	24	74	44	78	47
Olneyville	N.E.M.S.	52	2	48	6	59	11	84	22	92	40	96	46
Providence	N.E.M.S.	58	−2	54	7	.....	.....	77	24	88	44	.....	.....
Do	N.E.M.S.	57	−7	51	2	58	10	84	22	90	37	96	42
Woonsocket	N.E.M.S.	54	−10	46	3	.....	.....	.....	.....	83	36	89	47
South Carolina:													
Abbeville	S.W.S.	69	10	73	28	76	28	87	32	92	57	100	56
Aiken	V.O.	72	16	75	30	77	30	89	34	89	55	101	52
Anderson	S.W.S.	66	12	74	32	75	31	87	36	[c]91	[c]60	98	50
Belfast	S.W.S.	.....	.....	.....	.....	76	34	83	38	.....	.....	99	64
Bennettsville	S.W.S.	.....	.....	75	29	81	28	94	31	96	48	107	50
Blackville	S.W.S.	.....	.....	.....	.....	.....	.....	.....	.....	94	43	102	56
Brewer Mine	S.W.S.	.....	.....	.....	.....	.....	26	[k]93	[k]29	94	49	105	50
Charleston	S.S.	70	17	80	34	80	[v]34	85	33	89	55	100	57
Cheraw	S.W.S.	73	7	74	26	79	27	90	.....	94	46	104	50
Columbia	S.S.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	102	54
Florence	S.W.S.	72	.....	75	29	78	28	89	30	93	50	103	51
Hardeeville	S.W.S.	.....	.....	.....	.....	.....	.....	.....	.....	92	48	[d]103	[d]53
Kirkwood	V.O.	67	12	71	31	72	29	82	32	83	56	93	58
Marion	S.W.S.	70	14	76	31	77	30	90	32	90	49	103	51
Newberry	S.W.S.	.....	.....	.....	.....	76	30	85	34	86	60	98	58
Spartanburgh	V.O.	46	31	71	28	62	33	91	44	95	47	112	50
Statesburgh	V.O.	71	12	74	31	75	29	[g]87	30	86	52	99	52
Winnsborough	S.W.S.	.....	.....	.....	.....	80	24	94	28	95	52	104	52
Yamassee	S.W.S.	.....	.....	.....	.....	.....	.....	.....	.....	91	48	103	52
Tennessee:													
Andersonville	S.W.S.	65	0	66	22	73	22	87	21	87	55	94	51
Ashwood	V.O.	68	3	71	24	73	28	85	34	87	54	96	55

average range of temperature, etc.—Continued.

July.		August.		September.		October.		November.		December.		Annual range.	Authority.
Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.		
°	°	°	°	°	°	°	°	°	°	°	°		
108	62	104	47	97	33	79	26	70	0	50	− 2	.....	Luke S. Motte.
100	56	96	39	88	31	80	16	.....	− 6	.....	1	.....	Dr. O. N. Stoddard.
99	58	96	40	92	30	79	19	69	− 2	54	− 3	108	Charles W. Rice.
98	52	93	39	89	28	84	14	69	5	53	2	109	A. G. Frost.
92	51	94	50	89	40	78	28	64	22	53	28	92	John Briggs.
103	38	94	40	94	34	87	28	73	16	58	17	91	
75	44	77	48	80	47	71	42	60	30	55	32	.....	
66	38	69	46	71	37	[a]86	[a]38	63	28	56	32	68	George Bennett.
88	51	89	50	86	39	70	32	59	22	51	26	90	Thomas Pearce.
92	40	90	40	90	38	72	30	58	22	54	28	90	Dr. George Wigg.
92	26	87	27	84	12	77	12	64	2	49	4	107	
94	25	90	26	87	13	82	11	70	2	57	3	110	U. S. post pospital.
95	38	90	32	84	28	80	22	66	7	48	14	96	
88	41	89	41	82	33	77	28	66	1	49	9	92	Rev. J. K. Romig.
93	42	90	41	.....	.....	[a]76	[a]25	[a]74	[a]12	48	13	99	
93	51	94	50	89	46	82	26	.....	.....	.....	.....	.....	Rev. F. Barnabas Held.
93	46	90	45	87	40	75	33	68	25	57	29	90	
93	40	89	45	95	36	82	26	69	20	58	26	95	
102	61	95	44	83	36	79	22	69	18	60	10	101	Charles B. Dudley.
100	68	92	52	84	34	82	23	68	19	.....	.....	.....	Lerch and Rice.
98	64	89	49	85	28	82	17	66	14	57	3	112	John Grathwohl.
96	55	86	44	82	35	80	18	71	16	56	10	.....	William G. Yetter.
97	42	98	38	92	24	83	15	66	13	54	2	.....	William Loveland.
98	53	87	40	83	32	80	18	68	6	57	1	105	H. D. Miller.
93	50	86	38	78	27	77	14	65	8	52	− 6	111	Theodore Day.
92	58	94	47	92	38	79	26	70	14	58	8	98	
94	67	86	54	85	41	79	29	.....	.....	.....	.....	.....	Milnor Gillingham.
96	56	90	40	84	26	76	16	68	10	.....	.....	.....	Joseph Bell.
96	68	90	54	.....	.....	80	28	68	21	56	10	.....	Thomas Meehan.
100	62	90	50	86	30	78	10	70	12	50	6	112	Nathan Moore.
.....	.....	92	60	92	49	74	36	.....	.....	52	16	.....	J. H. Montgomery.
100	68	90	56	86	42	84	31	70	25	59	14	92	
91	66	85	41	82	24	78	10	64	10	58	0	103	L. Ray Morgan.
100	60	93	46	92	36	80	20	74	14	62	8	97	
90	60	86	44	84	33	82	23	67	18	58	3	89	J. L. Heacock.
[a]92	[a]69	83	56	79	42	71	26	66	20	56	12	.....	C. M. Dechant.
97	56	90	40	82	32	78	12	70	8	52	3	104	William Frear.
96	56	92	40	78	32	80	15	71	1	60	8	110	Hiram D. Deming.
99	58	91	42	84	31	.....	.....	72	13	54	6	.....	Rev. F. R. Hodge.
96	64	86	51	84	37	84	26	66	20	57	11	94	Dr. Jesse C. Green.
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	Charles Beecher.
83	50	82	49	74	47	70	36	60	20	58	13	82	
88	61	87	50	76	38	71	27	62	14	55	7	90	N. G. Herreshoff.
90	58	85	48	75	35	75	28	65	16	58	7	93	
87	62	84	51	76	42	70	30	63	10	56	8	87	T. Dunn.
98	60	92	40	86	36	80	26	75	14	60	5	96	C. H. Cannon.
94	63	.....	.....	.....	.....	.....	.....	66	11	56	7	.....	City Engineer's Office.
95	.....	.....	.....	80	32	76	24	67	12	55	4	.....	D. W. Hoyt.
97	62	90	49	80	33	76	24	65	13	57	4	.....	A. Wagner.
102	67	94	54	93	42	84	38	72	19	[a]65	[a]21	92	J. C. Klugh.
.....	.....	.....	.....	.....	.....	[b]82	[b]41	77	23	69	23	.....	Dr. W. H. Geddings.
98	66	88	53	.....	.....	.....	.....	.....	.....	.....	.....	.....	Del Kemper.
98	74	95	66	.....	.....	.....	.....	73	25	70	28	.....	Pinckney Brown.
108	64	93	54	.....	.....	.....	.....	.....	.....	.....	.....	.....	J. H. Wells.
102	65	99	57	93	40	83	36	75	26	72	22	.....	S. S. Turner.
104	65	98	53	98	39	87	35	75	22	67	18	.....	N. Neilsen.
98	70	98	67	90	49	88	43	77	28	73	29	83	
108	64	95	53	93	37	86	36	77	23	68	18	97	W. R. Godfrey.
104	67	95	56	96	43	85	36	77	23	67	23	.....	
105	62	98	54	96	38	86	35	77	25	.....	.....	.....	Prof. H. Walshe.
103	67	100	66	98	42	88	37	79	23	73	24	.....	W. J. Evans.
95	72	87	58	83	40	77	34	64	23	58	19	83	Colin Macrae.
103	66	95	55	94	41	84	37	[a]76	[a]26	61	31	89	S. H. Price, B.G.Gregg, Ph. D.
98	72	.....	.....	.....	.....	.....	.....	.....	.....	65	24	.....	W. G. Petersen.
107	60	94	49	94	45	91	26	76	14	76	19	98	John F. Bayerly.
103	67	92	57	93	43	84	38	76	24	67	23	91	W. W. Anderson, M. D.
104	65	94	52	95	38	87	34	76	18	69	19	.....	James Pagan.
102	65	99	63	95	49	86	48.	78	38	.....	.....	.....	M. Wingard.
.....	.....	100	53	95	34	80	26	74	12	65	9	.....	J. K. Wallace.
97	70	98	55	97	45	83	28	73	13	60	9	95	Rev. C. F. Williams.

Table of maximum and minimum temperature and

Stations.	Character of station.	January.		February.		March.		April.		May.		June.	
		Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
Tennessee—Continued.		°	°	°	°	°	°	°	°	°	°	°	°
Austin	V. O.	71	2	75	26	75	24	90	32	90	56	100	59
Beech Grove	S. W. S.	70	4	75	25	74	25	.....	.....	88	58	96	59
Careyville	S. W. S.	64	6	70	27	72	20	84	30	84	56	91	54
Chattanooga	S. S.	70	7	74	27	76	25	89	34	90	53	98	53
Cookeville	S. W. S.	61	2	68	20	70	26	86	30	89	50	100	50
Covington	S. W. S.	68	4	73	26	73	31	84	40	88	55	91	61
Farmingdale	S. W. S.	68	— 2	.....	.....	74	19	85	26	87	44	96	45
Fayetteville	S. W. S.	.....	.....	72	27	76	26	86	33	88	59	99	60
Florence Station	S. W. S.	69	4	73	26	72	28	86	37	87	59	95	61
Fostoria	S. W. S.	68	3	68	25	70	24	83	28	84	48	90	48
Greenville	S. W. S.	68	2	70	20	74	18	83	26	88	46	92	48
Grief	S. W. S.	69	5	73	21	76	25	90	30	89	53	96	56
Hohenwald	S. W. S.	72	2	76	20	74	18	90	24	90	54	98	46
Knoxville	S. S.	69	5	73	22	76	22	89	29	88	52	96	51
McKenzie	S. W. S.	68	2	74	24	72	28	88	33	90	56	98	50
Manchester	S. W. S.	68	4	72	20	72	19	85	28	87	55	96	57
Memphis	S. S.	72	4	74	26	77	30	87	38	90	54	97	56
Milan	V. O.	70	1	75	24	77	27	90	30	91	55	99	49
Nashville	S. S.	70	— 2	75	23	77	24	89	32	89	50	96	52
Parksville	S. W. S.	69	8	71	26	77	24	87	29	.....	.....	93	52
Riddleton	S. W. S.	73	4	76	24	74	23	89	30	89	52	96	52
Rogersville	S. W. S.	61	0	66	25	68	20	85	31	88	51	98	53
Savannah	S. W. S.	69	5	74	25	75	26	89	30	89	58	99	58
Trenton	S. W. S.	68	1	72	23	73	28	85	30	88	54	93	47
Waverly	S. W. S.	70	1	74	22	75	24	90	33	91	55	96	54
Waynesborough	S. W. S.	70	8	70	26	72	26	86	30	90	56	92	50
Texas:													
Abilene	S. S.	83	6	81	11	91	34	99	38	100	45	101	60
Austin	V. O.	81	17	80	30	89	36	96	44	100	51	102	66
Brownsville	S. S.	88	28	81	40	88	47	92	51	91	56	91	68
Cleburne	V. O.	82	0	76	15	85	21	90	28	92	50	94	64
Concho, Fort	M. P.	85	5	84	14	95	34	101	34	101	43	107	64
Corpus Christi	S. S.	.....	.....	86	33	90	46	88	46	96	57	95	70
Davis, Fort	S. S.	73	16	82	21	82	25	86	35	91	43	93	55
Elliott, Fort	S. S.	73	— 4	77	3	83	24	90	29	92	39	94	57
El Paso	R. R.	65	15	82	30	94	40	92	48	100	64	108	80
Do	S. S.	70	18	72	21	87	29	90	35	97	41	101	52
Galveston	S. S.	75	24	75	47	79	46	81	51	87	57	88	68
McIntosh, Fort	M. P.	84	18	86	37	92	44	101	45	104	55	103	67
Midland	V. O.	79	7	79	15	90	28	98	36	.....	.....	102	65
New Ulm	V. O.	81	16	81	27	91	41	93	43	95	51	97	65
Palestine	S. S.	78	11	81	23	85	34	88	40	92	46	95	61
Ringgold, Fort	M. P.	93	23	98	39	100	43	107	45	112	54	104	64
R'o Grande City	S. S.	90	25	96	41	96	46	101	48	108	57	101	67
San Antonio	S. S.	81	17	84	28	93	39	95	37	97	47	101	64
Silver Falls	V. O.	78	— 5	81	14	88	25	95	26	98	37	97	56
Utah:													
Blue Creek	R. R.	49	15	48	19	78	32	78	33	99	36	104	38
Corinne	R. R.	50	7	47	10	72	30	77	32	91	35	94	51
Frisco	S. S.	52	11	55	8	66	26	72	21	82	24	89	42
Kelton	R. R.	56	8	52	12	67	24	80	28	92	35	98	46
Ogden	R. R.	54	11	64	19	78	26	86	22	101	35	98	51
Promontory	R. R.	48	0	49	5	80	20	78	25	98	24	97	20
Salt Lake City	S. S.	52	12	53	13	74	28	81	27	93	31	97	44
Terrace	R. R.	44	20	38	20	60	30	68	36	.....	.....	100	52
Vermont:													
Brattleborough	V. O.	46	—22	45	— 6	48	— 5	71	7	91	36	93	40
Do	N. E. M. S.	46	—18	46	— 3	48	— 2	78	17	90	37	89	43
Burlington	V. O.	49	—17	40	— 6	44	— 4	65	14	84	38	87	51
Charlotte	V. O.	50	—17	43	—10	48	— 6	66	11	89	40	88	57
Chelsea	N. E. M. S.	40	—20	39	—12	44	— 8	58	14	78	37	78	47
Guilford Centre	N. E. M. S.	.....	.....	.....	.....	.....	.....	.....	.....	82	46	83	48
Jacksonville	N. E. M. S.	55	—23	47	—12	53	—17	70	4	86	30	92	34
Lunenburgh	V. O.	49	—25	42	—18	46	—12	62	8	82	38	86	53
Marlborough	N. E. M. S.	50	— 8	42	— 3	44	0	60	15	79	45	87	46
Newport	V. O.	41	—36	36	—20	44	—20	65	— 4	85	40	90	52
Northfield	S. S.	.....	.....	.....	.....	45	—15	68	— 1	84	29	88	40
Strafford	V. O.	42	—24	40	—12	42	— 6	60	12	84	36	88	48
Townshend	N. E. M. S.	.....	.....	50	— 1	51	10	67	20	93	41	93	58
Vernon	N. E. M. S.	46	—30	44	— 6	46	— 8	65	19	90	40	90	48
Windsor	N. E. M. S.	48	—33	47	—14	.....	.....	69	7	88	33	92	43
Woodstock	N. E. M. S.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	95	44

annual range of temperature, etc.—Continued.

July.		August.		September.		October.		November.		December.		Annual range.	Authority.
Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.		
°	°	°	°	°	°	°	°	°	°	°	°	°	
101	74	103	64	99	42	86	28	76	14	66	8	101	P. B. Calhoun.
100	70	98	57	.....	.....	90	26	75	15	65	10	.....	A. B. Robertson.
.....	.....	91	54	88	44	78	30	.....	.....	.....	.....	.....	David Hart, M. D.
99	64	96	58	95	41	84	32	76	16	60	13	92	
100	62	95	60	95	50	78	26	80	10	60	0	100	H. C. Taylor, Rutledge Smith.
94	68	94	60	94	50	85	31	73	17	60	14	90	James I. Hall.
98	56	96	48	.....	.....	.....	.....	.....	.....	.....	.....	.....	Lewis Boynton.
100	70	98	60	100	49	83	29	75	12	64	9	.....	John C. Diemer.
98	72	98	62	94	46	81	31	74	16	58	13	92	C. F. Vanderford.
91	61	92	48	90	38	78	29	70	10	64	8	89	Charles Foster.
96	67	93	49	90	36	79	28	76	10	61	10	94	H. C. Farnsworth, W. H. Brown.
98	66	95	54	.....	.....	81	29	75	10	61	12	.....	J. F. Cowden.
100	64	101	48	100	36	83	22	75	10	62	8	99	R. Downer.
100	65	94	54	94	38	82	28	73	15	64	14	95	
97	67	.....	.....	102	46	88	28	.....	.....	.....	.....	.....	C. Hawkins.
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	Wiley Hickerson.
99	67	98	59	99	49	88	33	76	18	62	14	95	
101	68	102	55	100	44	87	26	77	11	61	11	101	Dr. M. D. L. Jordan.
98	66	99	58	99	54	83	27	75	10	59	6	101	
98	65	93	52	95	36	.....	.....	74	13	64	15	.....	J. C. Williamson.
99	69	101	57	98	38	84	24	73	13	63	8	97	S. P. Fergusson.
97	68	92	57	89	38	78	33	69	10	62	10	97	S. M. Miller, M. D.
98	68	101	54	.....	.....	.....	.....	75	10	64	7	.....	H. R. Hinckle.
96	63	97	54	95	44	83	26	74	16	61	11	96	A. S. Currey.
99	71	99	59	97	43	83	24	69	18	58	9	98	Levi McCallum, R. T. Shannon.
95	70	96	56	97	42	87	27	76	16	60	10	89	C. Buchanan, M. D.
101	65	98	63	93	49	90	34	80	13	69	11	95	
104	71	101	71	96	52	90	41	79	33	76	22	87	Oscar Samostz.
92	65	93	71	90	63	86	50	80	40	79	26	66	
98	70	97	66	99	50	88	35	80	14	74	10	98	Dr. T. C. Osborn.
106	68	103	63	98	45	92	34	83	19	73	12	102	U. S. post hospital.
93	72	91	72	88	57	84	49	77	33	76	24	.....	
94	57	93	56	86	48	87	34	75	27	68	1	93	
99	60	98	50	95	30	89	25	79	— 5	62	— 4	104	
104	68	98	78	101	68	90	36	74	26	67	5	103	Southern Pacific R. R.
103	62	102	61	92	52	94	35	77	24	69	— 2	105	
93	67	91	71	88	57	84	48	76	37	74	29	70	
103	70	100	71	96	55	90	42	81	37	79	25	86	U. S. post hospital.
103	71	102	60	95	42	90	41	74	16	70	9	.....	J. C. Rathbun.
98	67	100	70	98	52	93	44	83	26	72	27	84	C. Runge.
102	66	100	62	92	50	87	39	80	20	79	11	91	
104	67	107	69	101	59	93	39	85	38	85	22	90	U. S. post hospital.
100	70	101	71	97	61	91	43	82	41	83	25	83	
101	68	100	67	94	50	90	44	80	28	74	22	84	
101	63	99	58	95	41	96	31	.....	.....	63	10	.....	C. M. Tilford.
107	64	101	53	89	45	74	33	64	16	49	10	97	Pacific Railroad system.
102	62	95	51	91	45	80	30	61	0	48	4	102	Do.
90	51	86	37	81	37	80	24	64	7	44	0	90	
104	52	95	43	86	40	82	20	61	— 3	52	— 5	109	Do.
102	60	106	54	96	42	84	27	66	10	50	5	101	Do.
103	58	98	37	94	35	89	19	78	—17	47	— 8	120	Do.
98	54	95	46	90	40	85	28	67	11	50	9	89	
104	60	96	50	86	50	86	42	70	8	40	8	.....	Do.
95	53	90	43	85	30	74	18	67	12	51	—10	117	W. H. Childs.
.....	.....	.....	.....	82	32	72	20	68	17	48	— 5	.....	H. B. Chamberlain.
92	60	86	47	[b]80	[b]38	71	24	62	7	48	—12	109	W. B. Gates.
94	60	.....	.....	.....	.....	75	23	59	8	48	— 8	.....	Miss M. E. Wing.
81	53	73	[a]48	68	33	66	19	58	— 2	42	— 9	101	H. L. Bixby.
86	61	.....	.....	76	36	68	22	61	3	44	— 6	.....	J. C. Cutting.
94	52	90	40	84	29	70	16	63	13	48	— 8	117	J. W. Hatch.
88	58	84	42	80	36	78	15	68	0	52	—14	113	H. A. Cutting.
92	61	85	52	77	36	79	19	57	4	48	— 6	100	C. A. Ames.
92	60	86	46	76	36	66	26	60	4	45	—26	128	Rev. E. P. Wild.
91	54	83	37	79	29	70	19	62	2	43	—21	.....	
90	56	86	48	76	38	70	22	58	— 2	44	—16	114	N. F. Scribner.
93	58	87	53	76	34	76	22	66	7	50	0	.....	A. Sanderson.
96	60	90	50	80	30	72	20	64	16	51	—10	126	A. Whitehead.
94	55	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
96	52	89	39	.....	.....	73	16	62	1	47	—30	.....	Miss E. J. Doton.

Table of maximum and minimum temperature and

Stations.	Character of station.	January.		February.		March.		April.		May.		June.	
		Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
		°	°	°	°	°	°	°	°	°	°	°	°
Virginia:													
Bird's Nest	V. O.	70	13	73	24	73	26	81	32	89	54	96	58
Bruington	V. O.	65	10	65	20	55	21	80	22	88	58	88	62
Cape Henry	S. S.	69	14	76	28	74	26	82	33	84	53	98	48
Chincoteague	S. S.	58	10	71	23	60	23	81	30	81	47	90	49
Dale Enterprise	V. O.	63	0	74	17	76	17	87	27	94	51	98	49
Lynchburgh	S. S.	65	6	72	20	81	24	85	31	94	47	98	49
Marion	V. O.	66	3	70	15	70	16	84	26	91	50	89	48
Monroe, Fort	M. P.	65	12	67	23	67	23	79	30	89	50	94	58
Norfolk	S. S.	69	13	75	27	76	25	84	32	92	50	96	56
Rappahannock	V. O.	69	—2	59	18	67	20	83	28	97	40	99	46
Summit	V. O.	68	2	72	12	70	14	83	24	88	41	96	46
University of Virginia	V. O.	61	17	64	31	62	28	74	33	91	44	83	62
Variety Mills	V. O.	65	1	71	13	74	14	83	22	90	42	96	47
Wytheville	V. O.	62	6	66	16	70	16	81	27	84	46	87	41
Washington Territory:													
Bainbridge Island	V. O.	52	30	54	14	64	30	70	31	88	34	90	44
Canby, Fort	S. S.	54	33	54	14	65	34	58	36	78	38	91	44
Kenewick	V. O.	58	14	62	—10	72	22	88	27	102	32	100	39
Olympia	S. S.	54	26	54	2	63	25	67	27	89	32	93	36
Port Angeles	S. S.	50	27	53	3	53	24	54	29	74	30	80	35
Spokane Falls	S. S.	51	9	53	—11	66	15	86	26	95	30	94	38
Spokane, Fort	M. P.	52	3	53	—9	67	10	79	17	99	29	97	37
Tacoma	V. O.	50	28	55	5	61	25	62	35	78	39	84	47
Tatoosh Island	S. S.	51	31	47	15	55	33	54	35	69	36	69	46
Townsend, Fort	M. P.	54	18	58	8	60	25	63	29	77	34	86	42
Vashon	V. O.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Walla Walla	S. S.	57	20	67	—3	72	21	81	29	99	37	96	44
Walla Walla, Fort	M. P.	56	21	69	—6	73	20	82	29	100	36	98	43
West Virginia:													
Clarksburgh	V. O.	61	—8	66	12	65	11	80	18	88	38	93	44
Helvetia	V. O.	68	—6	67	12	67	5	74	20	91	43	90	39
Middlebrook	V. O.	58	—6	60	5	61	4	76	16	83	43	84	43
Parkersburgh	V. O.	66	—3	67	15	72	16	84	27	88	44	92	54
Wisconsin:													
Beloit	V. O.	39	—36	45	—10	65	—4	80	26	88	40	99	46
Delavan	V. O.	40	—27	44	—12	62	—6	82	18	90	38	95	43
Embarrass	V. O.	44	—36	38	—25	52	—6	78	6	86	42	89	50
Fond du Lac	V. O.	41	—42	44	—20	57	—10	77	20	89	31	93	38
Franklin	V. O.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Green Bay	S. S.	40	—29	44	—17	46	—7	74	16	86	38	90	43
La Crosse	S. S.	41	—29	44	—19	66	—1	79	12	91	40	93	44
Lancaster	V. O.	41	—25	48	—20	.....	.....	83	14	.....	.....	96	42
Madison	V. O.	39	—29	44	—17	46	1	86	12	85	42	92	48
Manitowoc	V. O.	37	—18	40	—11	43	0	76	14	80	36	91	41
Milwaukee	S. S.	42	—16	49	—9	57	4	78	18	80	42	92	47
Prairie du Chien	V. O.	41	—31	44	—18	67	3	81	17	93	44	99	52
Wausau	V. O.	35	—36	39	—22	56	—8	78	3	87	31	91	40
Wyoming:													
Bridger, Fort	S. S.	46	—15	44	—10	60	17	70	7	81	26	81	30
Cheyenne	S. S.	.....	.....	.....	.....	68	12	76	16	84	24	90	34
Laramie, Fort	M. P.	59	—14	62	—20	74	11	83	16	91	23	97	40
Do	S. S.	60	—25	61	—22	73	8	83	14	90	22	97	40
McKinney, Fort	M. P.	57	—14	65	—30	71	10	79	24	85	30	97	36
Sheridan, Camp	M. P.	40	—21	47	—30	59	2	70	13	89	22	87	26
Washakie, Fort	M. P.	47	—25	54	—16	72	6	78	13	90	26	94	35

annual range of temperature, etc.—Continued.

July.		August.		September.		October.		November.		December.		Annual range.	Authority.
Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.		
°	°	°	°	°	°	°	°	°	°	°	°	°	
102	75	93	59	89	45	87	41	78	29	59	20	89	C. R. Moore.
98	76	96	57	.....	.....	.....	.....	.....	.....	.....	.....	.....	Rev. J. R. Garlick.
99	64	94	61	88	49	86	41	76	32	70	20	85	
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
104	64	98	49	92	31	89	28	72	18	62	6	104	L. J. Heatwole.
102	62	95	50	97	37	88	30	75	22	62	13	96	
96	61	92	48	[4]85	[4]30	76	25	69	10	62	4	93	A. T. Lincoln.
99	69	92	63	90	45	88	40	66	30	58	14	87	U. S. post hospital.
102	65	92	60	91	46	87	40	74	30	61	19	89	
105	64	98	60	98	34	90	21	86	19	78	13	107	W. H. Ireland.
100	57	97	46	89	31	84	24	70	16	59	7	98	John R. Sim.
99	60	83	64	77	49	78	36	65	32	59	12	79	James Wearmouth.
101	56	94	44	93	31	85	25	71	17	60	9	100	J. H. Micklen.
94	53	88	43	87	32	79	26	68	13	68	8	88	Howard Shriver.
88	43	88	42	78	40	65	29	62	24	56	30	76	R. M. Hoskinson.
67	46	73	48	78	46	72	42	59	33	52	34	77	
106	44	104	68	85	34	78	15	64	8	.....	.....	.....	Capt. A. W. Gray.
86	40	85	40	83	34	66	30	61	20	56	30	91	
78	37	82	39	73	32	63	29	61	24	52	29	79	
94	41	97	43	84	32	69	12	59	10	53	15	106	
101	40	100	42	88	31	73	13	57	5	54	10	110	U. S. post hospital.
80	51	82	48	76	42	65	37	63	22	54	30	79	Edw. N. Fuller.
68	46	66	44	70	43	60	40	58	36	52	35	55	
82	43	85	44	79	38	66	31	59	27	57	30	78	U. S. post hospital.
89	47	84	45	75	44	61	31	63	24	52	30	.....	Ford A. Carpenter.
98	48	98	44	84	38	72	24	68	13	63	20	102	
102	45	99	44	86	36	75	20	67	19	61	20	108	U. S. post hospital.
98	56	94	40	88	30	79	18	69	12	61	— 3	106	A. D. Lowndes.
94	56	92	40	88	30	76	22	71	18	65	6	100	Dr. C. F. Stucky.
86	55	84	47	80	30	74	22	64	9	54	— 4	92	S. F. H. Hewit.
100	62	96	44	92	40	80	16	75	12	60	6	103	T. G. Field.
99	47	90	45	[3]86	[3]33	78	14	64	— 5	51	—18	135	Beloit College Observatory.
98	48	101	43	80	32	80	2	65	— 6	48	—16	128	Geo. S. Collie.
94	54	89	48	78	34	75	6	67	—15	42	— 15	130	J. E. Breed.
100	43	100	39	82	30	73	11	65	—14	46	—23	142	J. C. Wedge.
101	64	103	71	93	63	75	14	46	—11	45	.....	.....	W. O. Silvius.
98	46	93	42	82	31	74	8	64	—12	47	—17	127	
96	49	96	42	85	34	82	6	68	—19	42	—21	127	
102	48	101	41	87	31	83	2	70	—22	45	—21	.....	Edw. Pollock.
94	56	95	49	83	43	77	12	64	—14	44	—16	124	Washburne Observatory.
96	46	88	44	77	32	69	11	69	—10	44	—13	114	Clasina Lüps.
100	52	93	47	86	38	74	15	69	— 4	53	— 7	116	
98	50	101	46	89	38	84	11	70	—14	44	—20	132	College of Sacred Heart.
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	A. C. Clark.
87	40	86	38	78	30	77	11	62	— 2	42	—18	105	
90	46	92	45	86	38	82	4	70	—12	56	—13	.....	
101	50	97	49	87	30	87	8	72	—27	51	—15	128	U. S. post hospital.
96	50	95	50	[7]87	[7]30	[5]86	—[5]5	[7]72	—[4]34	[6]51	—[6]17	132	
95	48	93	35	88	32	84	— 3	68	—11	54	—12	127	U. S. post hospital.
98	39	91	37	88	29	78	—20	68	—19	76	—16	123	Do.
101	40	95	37	84	25	84	—10	66	—26	51	—14	127	Do.

APPENDIX No. 24.

Monthly and annual precipitation at Signal Service, State weather service, Military Post, Central and Southern Pacific Railroad stations for 1887, *in inches and hundredths.*

References: S. S.—Second order stations of Signal Service. C. B.—Cotton-region stations of Signal Service. S. W. S.—Stations reporting through State weather services. M. P.—Stations reporting through Surgeon-General, U. S. A. V. O.—Voluntary observers reporting direct to Chief Signal Officer. R. R.—Stations reporting to headquarters Pacific Railway system. N. E. M. S.—Stations reporting to New England Meteorological Society. Letters of alphabet donate number of days missing from the record.

State and stations.	Character of station.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Annual.	Authority.
Alabama:															
Auburn	S. W. S.	4.65	6.79	2.27	1.59	3.73	.....	21.09	4.32	7.16	2.74	0.08	13.84	.....	P. H. Mell, jr., W. H. Dunlap, Howard Lamar.
Bermuda	S. W. S.	3.78	2.35	0.11	1.26	1.30	2.22	8.39	2.06	4.04	3.41	1.42	6.74	37.08	William Fowler.
Carrollton	S. W. S.	3.45	5.75	2.24	3.99	3.00	3.44	4.90	3.22	2.86	2.95	0.60	8.26	44.66	Judge M. S. Stansel.
Decatur	C. B.	6.80	6.85	2.80	3.15	2.49	4.31	5.26	1.99	2.03	3.95	0.80	4.00	44.37	J. M. Vickron.
Demopolis	S. W. S.	3.55	5.02	.....	1.62	.....	1.00	.....	4.20	4.26	4.00	.....	.....	.....	W. W. Legare, W. M. Walsh.
Eufaula	C. B.	.....	.....	.....	.....	0.68	2.02	9.15	3.12	3.55	3.76	.....	.....	.....	Signal Service.
Do	S. W. S.	4.43	6.70	3.58	2.36	1.62	3.80	12.13	.....	.....	3.66	.....	.....	.....	James Milton.
Evergreen	C. B.	.....	.....	.....	.....	2.13	5.62	6.81	3.15	3.26	2.21	.....	.....	.....	Signal Service.
Fayette	S. W. S.	6.50	.....	2.00	3.10	1.10	3.20	.....	2.06	6.00	.....	6.00	.....	.....	F. P. McConnell.
Florence	S. W. S.	4.59	7.06	3.84	2.69	1.46	4.26	3.51	3.94	3.56	4.00	1.00	6.04	45.95	J. W. Milner.
Fort Deposit	C. B.	.....	.....	.....	.....	3.57	3.09	9.11	0.37	0.97	3.54	.....	.....	.....	Signal Service.
Gadsden	S. W. S.	2.38	4.82	3.25	1.35	0.91	1.28	7.50	1.59	3.05	3.50	0.40	11.10	41.13	Prof. D. P. Goodhue.
Greensborough	V. O.	3.32	4.90	1.04	2.58	3.37	4.29	3.09	3.45	.....	.....	.....	.....	.....	Capt. J. W. A. Wright.
Greenville	C. B.	.....	.....	.....	.....	3.38	5.22	10.53	2.33	2.37	3.05	.....	.....	.....	Signal Service.
Livingston	C. B.	.....	.....	.....	.....	6.20	1.85	4.92	2.68	2.60	4.45	.....	.....	.....	Do.
Do	V. O.	3.22	4.25	1.54	2.69	6.20	1.85	4.92	2.68	3.43	4.93	0.35	9.65	45.71	Capt. J. W. A. Wright.
Marion	C. B.	.....	.....	.....	.....	6.19	3.34	5.91	3.66	5.64	7.70	.....	.....	.....	Signal Service.
Do	S. W. S.	2.50	6.30	0.95	2.04	6.60	1.65	3.50	.....	3.51	3.30	.....	.....	.....	Prof. A. D. Smith.
Mobile	S. S.	2.90	6.62	3.67	1.93	3.06	8.91	4.31	4.31	6.21	2.45	0.44	7.21	52.00	Signal Service.
Montgomery	S. S.	5.08	7.47	0.72	1.18	2.84	3.31	8.56	2.04	2.03	2.47	0.79	8.25	44.74	Do.
Mount Vernon Barracks	M. P.	4.49	6.93	0.93	0.67	1.12	6.17	6.01	0.58	8.48	4.06	1.18	9.92	46.90	U. S. post hospital.
Mount Willing	S. W. S.	5.14	8.65	0.20	1.00	2.84	3.23	7.58	1.23	2.25	.....	.....	15.95	.....	W. M. Garrett.
Newton	S. W. S.	6.50	.....	1.58	3.35	0.95	.....	.....	.....	2.50	.....	0.00	8.00	.....	O. D. Killibrew, Prof. C. S. McCarthers.
Opelika	C. B.	.....	.....	.....	.....	5.09	2.56	20.18	6.53	2.56	3.04	.....	.....	.....	Signal Service.
Oswichee	S. W. S.	.....	3.95	.....	.....	1.92	4.93	11.80	4.80	2.11	3.80	1.39	8.58	.....	Dr. W. C. Whitaker.
Pine Apple	C. B.	.....	.....	.....	.....	1.80	0.83	0.57	0.17	1.08	0.22	.....	.....	.....	Signal Service.
Scottsborough	C. B.	.....	.....	.....	.....	1.07	4.47	5.59	3.67	2.25	1.50	.....	.....	.....	Do.
Selma	S. W. S.	2.44	5.00	1.00	1.22	1.82	2.90	4.52	0.90	3.60	1.51	.....	.....	.....	Miss S. V. A. Hunt.
Trinity	C. B.	4.25	9.40	4.00	3.20	3.45	4.85	.....	.....	.....	2.80	1.00	14.60	.....	Dr. Joseph Shackelford.
Tuscaloosa	S. W. S.	3.48	4.31	0.88	2.07	3.46	5.23	3.94	3.40	4.63	2.47	0.61	11.64	46.12	J. C. Perkins.
Tuscumbia	C. B.	.....	.....	.....	.....	0.87	3.86	4.74	1.75	2.73	3.80	.....	.....	.....	Signal Service.
Do	S. W. S.	5.40	6.19	4.07	2.33	1.23	3.81	5.17	3.67	2.88	4.95	1.23	5.79	46.72	L. B. Thornton.
(Near) Union Springs	S. W. S.	3.63	4.85	0.58	1.99	2.66	5.09	15.77	0.90	5.03	2.32	1.87	7.83	52.52	Rev. J. L. Moultrie.

Union Springs	S. W. S.	4.00	4.12	0.62	1.69	2.28	3.96	15.28	.....	4.00	.....	1.12	7.88	.....	C. M. Franklin.
Valley Head	S. W. S.	3.35	6.12	0.60	3.75	3.77	5.30	7.50	.....	T	3.70	0.47	7.88	.....	Dr. E. P. Nickolson.
Alaska:															
Hoochnahoo	S. S.	12.75	2.10	6.00	3.15	1.80	3.45	3.95	6.00	6.55	10.85	6.45	6.50	70.15	Signal Service.
Sitka	S. S.	7.83	4.92	7.38	6.64	7.30	5.01	7.62	9.38	10.55	.....	.....	.....	.....	Do.
Arizona:															
Apache, Fort	S. S.	0.59	2.16	0.04	0.81	0.15	1.70	3.29	3.92	2.23	0.55	1.83	0.57	17.84	Do.
Benson	R. R.	0.00	0.34	0.00	T	0.08	0.00	1.49	2.39	2.92	0.45	0.37	0.15	8.19	Pacific railway system.
Bowie, Fort	S. S.	0.13	2.11	0.00	0.28	T	1.30	4.49	5.51	2.71	1.01	1.10	1.94	20.53	Signal Service.
Casa Grande	R. R.	0.00	0.40	0.00	0.30	0.20	0.40	1.07	0.97	1.99	0.96	1.28	0.15	7.71	Pacific railway system.
Grant, Fort	S. S.	0.11	2.58	T	0.36	0.16	0.85	9.00	6.20	4.20	0.37	0.28	0.21	24.32	Signal Service.
Huachuca, Fort	M. P.	.....	1.30	0.00	0.00	.....	0.72	4.08	.....	3.48	0.77	1.16	1.80	.....	Do.
McDowell, Fort	M. P.	0.00	0.86	T	0.68	T	...	0.06	1.52	8.23	0.44	1.55	0.67	.....	U. S. post hospital.
Do	S. S.	0.00	0.86	0.00	0.68	T	0.00	0.06	1.54	4.11	0.48	1.82	0.77	10.32	Signal Service.
Maricopa	R. R.	0.00	0.57	0.00	0.05	0.25	0.00	....	.....	.....	0.28	1.13	0.00	.....	Pacific railway system.
Do	S. S.	0.00	0.17	T	0.51	0.31	0.03	h0.43	.....	.....	.....	.....	.....	.....	Signal Service.
Mojave, Fort	M. P.	.....	1.44	T	0.00	0.25	T	0.25	1.62	0.09	0.45	0.14	0.80	.....	U. S. post hospital.
Pantano	R. R.	0.00	1.15	0.00	0.00	.....	0.31	1.86	2.66	1.38	0.38	0.50	1.19	.....	Pacific railway system.
Phœnix	S. S.	0.00	0.28	T	0.75	0.06	0.00	.....	.....	.....	.....	.....	.....	.....	Do.
San Carlos	S. S.	T	1.12	0.00	0.23	0.06	0.31	2.49	1.56	0.88	0.08	.....	1.45	.....	Signal Service.
San Simon	R. R.	0.01	0.78	0.00	0.10	0.00	0.00	0.00	0.00	0.10	0.00	0.00	0.00	0.99	Pacific railway system.
Texas Hill	R. R.	0.00	0.01	0.00	0.00	0.00	0.00	T	T	2.82	0.00	1.40	0.05	3.35	Do.
Thomas, Fort	S. S.	0.09	0.84	0.00	0.31	2.73	0.35	3.78	2.53	3.87	0.28	0.52	1.05	16.35	Signal Service.
Tucson	V. O.	.....	.....	.....	0.38	0.32	0.26	5.08	1.25	2.08	1.72	0.74	0.27	.....	E. L. Wetmore.
Do	R. R.	0.00	0.84	0.00	0.04	0.27	0.06	4.22	0.00	1.99	0.43	0.23	0.07	8.15	Pacific railway system.
Verde, Fort	S. S.	0.04	0.78	0.02	0.58	0.60	0.18	3.11	2.96	4.72	0.00	1.37	.....	.....	Signal Service.
Whipple Barracks	S. S.	T	3.12	T	2.57	0.43	0.57	2.64	0.71	4.88	0.05	1.57	0.82	17.36	Do.
Wilcox	S. S.	T	1.83	0.00	0.03	0.48	0.47	3.82	5.31	2.96	0.45	0.22	0.92	16.49	Do.
Do	R. R.	T	1.44	0.00	0.08	0.40	0.54	3.51	5.15	2.68	0.45	0.31	0.78	15.34	Pacific railway system.
Yuma	S. S.	0.00	T	0.00	0.20	T	0.01	T	T	1.09	0.02	2.43	0.15	3.90	Signal Service.
Do	R. R.	0.00	0.00	0.00	0.00	0.00	0.11	0.00	0.00	.....	T	1.92	0.15	.....	Pacific railway system.
Arkansas:															
Alexander	S. W. S.	.....	.....	.....	0.72	6.75	1.40	2.37	0.65	0.75	2.55	5.35	7.50	.....	P. Williams, Isaiah Williams.
Conway	S. W. S.	1.05	4.60	3.32	0.10	8.46	4.35	2.80	4.17	2.31	0.36	3.57	5.70	40.79	A. P. Robinson.
Dallas	S. W. S.	.....	.....	.....	.....	6.00	2.37	1.75	2.69	1.75	0.37	2.50	7.50	.....	T. M. Carden.
Devall's Bluff	C. B.	.....	.....	.....	.....	3.66	0.29	3.12	3.55	0.70	1.50	.....	.....	.....	Signal Service.
Eureka Springs	S. W. S.	0.00	.....	2.00	2.62	7.90	4.00	2.34	4.95	6.90	2.35	1.98	3.50	.....	A. H. Foote.
Forest City	C. B.	.....	.....	.....	.....	0.57	0.70	8.70	3.91	0.12	0.00	.....	.....	.....	Signal Service.
Fort Smith	S. S.	0.79	4.39	1.53	2.31	6.51	2.30	2.26	4.94	3.74	3.47	2.23	4.22	38.69	Do.
Helena	S. W. S.	.....	.....	3.00	2.20	1.50	0.30	2.69	0.90	0.00	1.50	.....	6.50	.....	George Warren.
Hot Springs	M. P.	.....	5.36	4.38	0.48	6.65	1.98	5.70	1.56	1.68	2.44	4.38	11.16	.....	U. S. post hospital.
Lead Hill	V. O.	1.33	4.08	2.84	3.02	8.57	6.07	1.82	8.28	4.69	1.50	3.64	3.69	49.53	Silas C. Turnbo.
Little Rock	S. S.	2.26	6.42	4.54	0.49	6.08	2.20	1.74	1.18	1.04	0.97	4.50	7.14	38.56	Signal Service.
Monticello	C. B.	.....	.....	.....	.....	2.90	1.74	4.57	1.90	2.83	0.00	.....	.....	.....	Do.
Newport	C. B.	.....	.....	.....	.....	0.49	0.37	0.28	0.14	0.11	0.02	.....	.....	.....	Do.
Osceola	S. W. S.	0.30	5.80	.....	2.60	4.10	3.20	0.80	3.30	2.50	.....	.....	.....	.....	Dr. D. A. Richardson.
Pine Bluff	C. B.; S. W. S.	1.50	.....	.....	.....	.....	0.55	5.15	3.71	1.06	2.30	.....	.....	.....	H. B. Misell, W. E. McEwen.
Prescott	W. S.	.....	.....	.....	.....	.....	0.94	2.68	0.65	1.40	0.11	1.40	.....	.....	William Fitzgerald, William Friganza.
Russellville	C. B.; S. W. S.	1.20	4.65	2.98	1.20	7.83	2.60	1.60	3.68	3.81	0.11	.....	.....	.....	W. B. McDonald, Signal Service.
Springdale	S. W. S.	e1.10	4.00	2.50	0.90	.....	4.20	2.30	.....	.....	.....	.....	.....	.....	John B. Gill, Hubbert Gill.
Texarkana	C. B.	.....	.....	.....	.....	5.14	0.00	0.32	0.25	0.40	0.36	.....	.....	.....	Signal Service.

Monthly and annual precipitation at Signal Service, State weather service, Military Post, Central and Southern Pacific R. R. stations, 1887—Continued.

State and stations.	Character of station.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Annual.	Authority.
Arkansas—Continued.															
Texarkana	S. W. S.	.....	.....	.....	.....	5.14	0.00	0.82	0.25	0.40	0.98	1.01	2.29	.....	M. J. Nash.
Washington	S. W. S.	.....	.....	.....	.....	3.55	3.65	3.06	1.86	1.31	.....	6.48	10.46	.....	A. H. Carrigan.
California:															
Alcatraz Island	M. P.	1.40	.....	0.85	2.75	T	0.05	0.00	0.00	0.16	0.00	0.80	3.80	.....	U. S. post hospital.
Almaden	R. R.	1.52	8.68	0.92	1.60	0.00	0.00	0.00	0.00	0.20	0.05	0.78	4.44	18.19	Pacific railway system.
Anaheim	R. R.	0.43	5.71	0.00	2.21	T	0.00	0.00	0.00	T	0.75	0.92	2.16	12.18	Do.
Anderson	V. O.	1.41	.....	.....	3.12	0.66	1.20	.....	0.00	0.15	0.00	1.72	.....	.....	Dr. A. Fouch.
Angel Island	M. P.	1.96	8.77	.....	1.95	T	0.10	T	0.00	0.11	0.00	0.17	2.47	.....	U. S. post hospital.
Antioch	R. R.	0.38	3.87	0.49	0.95	0.00	0.00	0.00	0.00	0.41	0.00	0.29	2.30	8.69	Pacific railway system.
Aptos	R. R.	0.95	8.82	0.76	1.61	0.19	0.00	0.00	0.00	0.47	0.05	1.11	3.72	17.68	Do.
Athlone	R. R.	0.38	3.52	0.23	1.62	0.00	0.23	0.00	0.00	0.58	0.00	0.23	1.11	7.90	Do.
Auburn	R. R.	2.04	12.38	1.50	4.34	0.30	0.00	0.00	T	1.09	0.00	1.22	4.90	27.77	Do.
Benicia Barracks	M. P.	1.12	7.17	0.59	2.04	T	T	T	0.00	0.42	0.00	0.38	3.50	15.22	U. S. post hospital.
Bidwell, Fort	S. S.	3.31	4.85	0.97	1.96	1.47	0.73	0.18	0.21	0.05	0.00	0.38	2.40	16.51	Signal Service.
Do	M. P.	2.57	3.87	1.05	1.52	1.25	0.97	0.19	0.22	0.03	0.00	0.30	1.77	18.74	U. S. post hospital.
Bishop Creek	R. R.	0.65	1.58	0.00	0.35	0.55	0.35	0.00	0.00	0.40	0.15	0.05	1.10	5.18	Pacific railway system.
Boca	R. R.	0.80	12.70	0.00	1.80	T	0.30	0.00	0.00	0.00	0.00	0.03	5.74	21.07	Do.
Borden	R. R.	0.25	2.24	0.30	2.37	0.00	0.00	0.00	0.00	0.46	0.05	0.28	0.78	6.73	Do.
Brentwood	R. R.	0.38	5.05	0.61	1.61	0.00	0.00	0.00	0.00	0.50	0.00	0.40	2.62	11.17	Do.
Brighton	R. R.	0.80	4.87	1.08	1.98	0.00	0.00	0.00	0.00	0.00	0.00	0.57	2.70	12.00	Do.
Byron	R. R.	0.48	4.43	0.19	1.21	0.00	0.00	0.00	0.00	0.00	T	0.42	2.90	9.63	Do.
Cahuenga Valley	V. O.	0.26	8.72	0.28	2.46	0.23	0.08	0.10	0.00	0.12	0.13	.....	.....	.....	Seward Cole.
Caliente	R. R.	0.38	2.79	0.07	2.66	0.21	0.00	0.00	0.00	0.00	0.63	0.05	0.43	8.22	Pacific railway system.
Calistoga	R. R.	2.22	11.18	1.58	2.82	T	0.00	0.00	0.00	0.18	0.00	1.50	4.82	24.30	Do.
Chico	R. R.	0.68	6.53	1.38	2.31	0.00	0.96	0.00	0.00	0.00	0.00	1.05	2.53	15.44	Do.
Cisco	R. R.	4.90	22.85	0.80	0.95	0.00	0.00	T	0.00	0.15	0.00	1.60	8.80	40.05	Do.
Colfax	R. R.	2.99	9.24	1.51	4.92	0.72	0.00	0.00	0.00	0.68	0.00	1.61	6.00	27.67	Do.
Colton	R. R.	0.21	3.64	0.00	1.94	0.00	0.00	0.00	0.00	0.00	0.84	.....	0.80	.....	Do.
Corning	R. R.	0.45	6.81	1.46	2.86	0.28	0.18	0.00	0.00	0.00	0.00	1.37	3.70	17.11	Do.
Davis	R. R.	0.99	6.14	0.78	2.03	0.00	0.00	0.00	0.00	0.05	0.00	0.50	2.52	13.01	Do.
Delano	R. R.	0.20	2.63	0.00	1.44	0.68	0.00	0.00	0.00	0.00	a0.00	0.03	0.60	5.58	Do.
Delta	R. R.	3.84	10.27	3.37	5.58	1.26	0.82	0.00	0.00	0.00	0.00	0.50	2.23	27.82	Do.
Dunnigan	R. R.	0.97	6.93	1.13	2.41	0.00	0.00	0.00	0.00	0.00	0.00	0.88	3.30	15.57	Do.
Elmira	R. R.	1.01	7.10	0.55	2.06	0.00	0.00	0.00	0.00	0.00	0.00	0.76	3.41	14.89	Do.
Emigrant Gap	R. R.	4.12	18.80	2.03	6.17	1.02	1.14	0.00	0.13	0.05	3.00	1.50	7.70	45.66	Do.
Eureka	S. S.	8.86	9.07	2.28	5.55	3.51	1.92	0.06	0.07	0.21	0.55	2.66	5.43	40.17	Signal Service.
Fall Brook	V. O.	0.28	5.65	0.05	2.02	0.24	0.06	0.05	0.00	0.83	0.20	2.03	3.56	14.97	F. E. Fox.
Farmington	R. R.	0.36	3.37	0.29	2.80	0.00	T	0.00	0.00	0.39	T	0.02	2.32	9.64	Pacific railway system.
Fresno City	R. R.	0.31	2.80	0.09	2.65	0.03	0.02	0.00	0.00	0.52	0.29	0.27	0.67	7.65	Do.
Fresno	V. O. & S. S.	0.40	3.09	0.17	2.93	0.03	0.04	0.00	p0.00	0.49	0.15	0.32	1.16	8.78	Signal Service.
Galt	R. R.	0.61	5.35	1.11	2.56	0.00	0.00	0.00	0.00	0.15	0.00	0.38	2.27	13.43	Pacific railway system.

Gaston, Fort	M. P.	9.43	9.96	2.63	4.64	3.19	1.62	0.00	0.00	2.50	0.29	3.80	8.36	46.33	U. S. post hospital.
Gilroy	R. R.	0.90	5.14	0.82	2.05	0.00	0.00	0.00	0.00	0.43	0.00	1.15	4.32	14.81	Pacific railway system.
Goshen	R. R.	0.35	2.66	0.56	2.85	1.10	0.00	0.00	0.00	0.50	0.17	0.12	1.18	9.49	Do.
Hollister	R. R.	0.57	3.63	0.55	1.32	0.04	0.02	0.00	0.00	0.43	0.00	0.60	1.54	8.70	Do.
Hydesville	V. O.	8.70	8.48	2.21	5.30	2.21	0.94	0.00	0.00	0.28	0.30	1.96	6.65	36.96	E. T. Foss.
Indio	R. R.	0.00	0.93	0.00	0.30	0.00	0.00	0.00	T	0.05	0.15	0.00	0.00	1.43	Pacific railway system.
Ione	R. R.	0.83	7.26	1.55	1.44	0.10	0.00	0.00	0.00	0.67	0.00	0.25	3.17	15.27	Do.
Keeler	S. S.	T	0.93	0.00	1.14	0.04	T	0.52	0.00	1.08	0.84	0.01	0.48	5.04	Signal Service.
Do	R. R.	T	0.75	0.00	1.18	0.04	T	0.52	0.00	1.05	0.84	0.01	0.48	4.87	Pacific railway system.
Keene	R. R.	0.51	3.50	0.92	2.73	T	0.20	T	0.00	0.12	1.32	0.50	1.72	11.52	Do.
King City	R. R.	0.38	5.08	0.18	0.58	0.02	0.09	0.00	0.00	0.06	0.05	0.31	1.99	8.74	Do.
Kingsbury	R. R.	0.36	2.48	0.13	2.10	0.42	0.00	0.00	0.00	0.53	0.00	0.15	1.16	7.33	Do.
Knight's Landing	R. R.	1.00	6.60	0.75	2.30	0.00	0.00	0.00	0.00	0.00	0.00	0.57	3.26	14.48	Do.
Lathrop	R. R.	0.21	2.84	0.14	1.25	0.00	0.00	0.00	0.00	0.00	0.00	0.30	2.27	7.01	Do.
Lemoore	R. R.	0.23	2.19	0.10	2.07	1.03	0.12	0.00	0.00	0.15	0.33	0.33	0.90	7.45	Do.
Lewis Creek	V. O.	0.63	6.61	0.33	3.15	2.50	0.00	0.00	0.00	0.00	0.13	0.08	1.08	14.51	John Tuohy.
Livermore	R. R.	0.90	6.37	0.23	1.60	0.00	0.00	0.00	0.00	0.80	0.00	0.61	3.51	14.02	Pacific railway system.
Livingston	R. R.	0.37	2.41	0.43	1.46	0.00	0.00	0.00	0.00	0.17	0.00	0.11	1.81	6.76	Do.
Los Angeles	S. S.	0.20	9.25	0.29	2.36	0.20	0.07	0.07	T	0.18	0.17	0.80	2.68	16.27	Signal Service.
Do	R. R.	0.20	8.92	0.22	2.02	0.08	0.04	0.03	0.00	0.15	0.14	0.85	4.35	17.00	Pacific railway system.
Mammoth Tank	R. R.	0.00	1.38	0.00	0.13	0.00	0.00	0.00	0.00	0.33	0.03	0.20	0.05	2.12	Do.
Martinez	R. R.	0.94	7.46	0.56	1.94	0.00	0.00	0.00	0.00	0.33	0.00	0.30	0.95	12.48	Do.
Marysville	R. R.	0.78	6.09	1.62	1.90	0.10	0.09	0.00	0.00	0.00	0.00	1.07	3.70	14.70	Do.
Mason, Fort	M. P.	0.86	8.80	0.82	1.94	0.04	0.06	0.00	0.00	0.78	0.00	1.04	2.97	17.31	U. S. post hospital.
Menlo Park	R. R.	0.72	4.92	0.46	1.18	0.01	0.00	0.00	0.00	0.22	0.00	0.85	2.16	10.52	Pacific railway system.
Merced	R. R.	0.13	2.83	0.20	1.74	0.00	0.00	0.00	0.00	0.45	0.00	0.10	1.00	6.45	Do.
Modesto	R. R.	0.09	2.16	0.34	1.22	0.00	0.00	0.00	0.00	0.05	0.00	0.10	1.76	5.72	Do.
Mojave	R. R.	T	4.09	0.00	0.14	0.00	0.00	0.00	0.00	0.00	0.95	0.50	1.00	6.68	Do.
Monterey	R. R.	0.35	4.92	0.60	1.16	0.00	0.05	0.00	0.00	0.25	0.00	1.35	1.81	10.49	Do.
Napa	R. R.	1.87	10.68	0.67	2.27	0.17	0.00	0.00	0.00	0.00	0.00	1.35	4.18	21.19	Do.
Newhall	R. R.	0.00	12.38	0.15	1.96	0.10	0.03	0.00	0.00	0.02	0.65	1.46	4.26	21.01	Do.
Nicolaus	V. O.	1.12	6.75	0.96	2.22	0.01	3.04	0.00	T	0.01	0.00	1.00	3.02	18.18	Alvah Pendleton.
Niles	R. R.	1.20	9.44	0.83	1.27	0.07	0.00	0.00	0.00	0.54	0.00	0.93	.....	.....	Pacific railway system.
Oakland	V. O.	1.57	7.83	0.71	2.85	0.10	0.05	0.01	0.00	0.27	0.00	0.76	3.22	16.89	J. B. Trembley, M. D.
Do	R. R.	1.31	8.01	0.65	2.42	0.00	0.00	0.00	0.00	0.25	0.00	0.81	3.52	16.97	Pacific railway system.
Orland	R. R.	0.33	3.74	1.63	2.06	0.00	0.00	0.00	T	0.00	0.00	1.14	2.64	11.54	Do.
Oroville	V. O.	1.02	8.93	0.98	2.81	0.08	0.18	T	0.01	0.15	0.00	1.21	2.62	17.99	Hiram Arents.
Pajaro	R. R.	1.57	5.95	0.61	2.03	0.00	0.00	0.00	0.00	0.58	0.00	0.87	3.44	15.05	Pacific railway system.
Paso Robles	R. R.	0.51	6.14	0.34	1.10	0.44	0.00	0.00	0.00	0.00	0.21	0.60	2.61	11.95	Do.
Petaluma	R. R.	1.25	10.43	0.79	1.46	0.00	0.00	0.00	0.00	0.68	0.00	1.79	3.30	19.70	Do.
Pleasanton	R. R.	0.79	5.93	0.68	1.52	0.00	0.00	0.00	0.00	0.29	0.00	0.55	2.63	12.39	Do.
Poway	V. O.	.....	.....	0.34	2.01	.....	.....	.....	T	0.63	0.00	2.04	2.63	.....	Adams Poway.
Presidio of San Francisco	M. P.	1.26	7.32	0.78	1.80	T	0.00	0.00	0.00	1.40	0.00	0.40	2.44	15.40	U. S. post hospital.
Red Bluff	S. S.	0.57	5.21	1.13	1.76	0.77	0.26	T	T	0.06	0.00	1.52	2.32	13.60	Signal Service.
Do	R. R.	0.62	5.10	1.30	1.87	0.88	0.28	0.00	0.00	0.00	0.00	1.53	2.82	14.40	Pacific railway system.
Redding	R. R.	2.50	8.35	1.20	3.65	1.25	0.95	0.00	0.00	0.15	0.00	1.60	3.60	23.25	Do.
Riverside	V. O.	0.13	2.85	0.02	1.71	0.17	0.00	T	0.00	0.00	0.86	0.92	1.50	8.16	A. K. Holt.
Rocklin	R. R.	0.75	6.77	1.80	3.53	0.00	0.00	0.00	0.00	0.05	0.00	1.05	3.38	17.33	Pacific railway system.
Sacramento	S. S.	1.12	6.28	0.94	2.53	T	0.00	0.00	T	0.02	0.00	0.45	2.09	13.43	Signal Service.
Do	R. R.	0.75	4.94	0.89	1.60	T	0.00	0.00	0.00	0.01	0.00	0.33	2.15	10.67	Pacific railway system.
Do	V. O.	1.07	5.93	1.02	2.59	T	T	0.00	T	0.06	0.00	0.54	2.89	14.10	S. H. Gerrish.
Salinas	V. O.	0.75	4.73	0.54	1.63	0.07	0.00	0.00	0.00	0.71	0.00	0.98	2.16	11.57	E. K. Abbott, M. D.

Monthly and annual precipitation at Signal Service, State weather service, Military Post, Central and Southern Pacific R. R. stations, 1887—Continued.

State and stations	Character of station.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Annual.	Authority.
California—Continued.															
Salinas	R. R.	0.78	4.62	0.63	1.39	0.05	0.00	0.00	0.00	0.68	0.00	0.94	2.40	11.49	Pacific railway system.
San Ardo	R. R.	0.58	5.58	0.17	0.76	0.05	0.26	0.00	0.00	0.14	0.37	0.32	2.07	10.30	Do.
San Diego	S. S.	0.04	4.51	0.02	2.14	0.47	0.04	0.01	T	T	T	2.06	1.14	10.45	Signal Service.
San Fernandino	R. R.	0.21	8.54	0.27	2.52	T	0.00	0.00	0.00	T	0.22	0.90	1.41	14.07	Pacific railway system.
San Francisco	S. S.	1.90	9.24	0.84	2.30	0.06	0.07	T	0.01	0.29	T	0.99	3.34	19.04	Signal Service.
San Gorgonio	R. R.	0.06	5.07	0.08	2.94	0.14	0.00	0.07	0.00	0.00	1.23	1.51	.....	.....	Pacific railway system.
San José	R. R.	0.68	6.81	0.63	1.28	0.00	0.00	0.02	0.00	0.61	0.03	0.70	2.53	13.29	Do.
San Mateo	R. R.	1.21	9.17	0.72	1.68	0.00	0.00	0.00	0.00	0.47	0.00	1.08	3.44	17.77	Do.
San Miguel	R. R.	0.52	5.96	0.12	1.40	0.24	0.26	0.00	0.00	0.58	0.37	0.49	2.84	12.78	Do.
Santa Barbara	V. O.	0.31	8.64	0.13	1.43	0.33	0.03	0.00	0.00	0.38	0.31	1.10	4.43	17.09	Hugh D. Vail.
Santa Cruz	R. R.	1.01	9.62	0.53	1.90	0.02	0.00	0.00	0.00	0.42	0.42	1.21	4.58	19.71	Pacific railway system.
Santa Monica	R. R.	0.20	7.07	0.26	2.47	1.40	0.00	0.00	0.00	0.30	0.00	1.13	2.98	15.76	Do.
Selma	R. R.	0.31	2.84	0.00	2.60	0.58	0.00	0.00	0.00	.....	0.20	0.16	0.97	.....	Do.
Soledad	R. R.	0.34	3.94	0.41	0.54	0.00	0.00	0.00	0.00	0.16	0.00	0.51	1.47	7.37	Do.
South Side	R. R.	0.14	7.37	0.00	2.55	T	0.00	0.00	0.00	0.00	0.60	1.40	0.50	12.56	Do.
South Vallejo	R. R.	1.15	7.72	0.46	1.90	0.00	0.00	0.00	0.00	0.39	0.00	0.48	3.06	15.16	Do.
Spadra	R. R.	0.20	7.36	0.00	2.17	0.00	0.00	0.00	0.00	T	0.00	0.68	2.25	12.66	Do.
Stockton	R. R.	0.36	3.30	0.23	1.37	0.00	0.00	0.00	0.00	0.28	0.00	0.43	2.69	8.66	Do.
Suisun	R. R.	0.82	6.37	0.85	1.74	0.00	0.00	0.00	0.00	0.00	0.00	0.96	2.79	13.58	Do.
Summit	R. R.	6.25	20.70	1.40	5.80	0.45	1.60	0.10	T	T	0.07	1.50	11.60	49.47	Do.
Sumner	R. R.	0.20	2.23	0.00	2.04	0.20	0.00	T	0.00	0.00	0.55	0.10	0.69	6.01	Do.
Tehama	R. R.	0.33	4.29	1.10	1.56	0.45	0.00	0.00	0.00	0.00	0.00	1.56	2.62	11.91	Do.
Tehachapi	R. R.	0.50	8.88	0.24	2.15	0.26	0.00	0.00	0.00	0.00	0.86	0.26	1.44	14.59	Do.
Templeton	R. R.	0.61	7.21	0.47	1.51	0.06	0.35	0.00	0.00	0.56	0.24	0.79	3.13	14.98	Do.
Towles	R. R.	4.35	11.60	1.10	1.20	T	0.00	T	0.00	0.00	0.00	0.90	2.20	21.35	Do.
Tracy	R. R.	0.03	2.93	0.29	3.02	0.00	0.00	0.00	T	T	0.00	0.05	2.43	8.75	Do.
Traver	R. R.	0.45	3.05	0.32	2.27	0.70	0.14	0.00	0.00	0.26	T	T	0.97	8.16	Do.
Truckee	R. R.	3.43	12.25	0.36	2.00	2.04	0.37	0.40	T	0.00	0.00	0.30	4.80	25.95	Do.
Tulare	R. R.	0.45	1.28	0.11	1.52	0.90	0.00	0.00	0.00	0.01	0.18	0.05	0.70	5.90	Do.
Turlock	R. R.	0.16	2.30	0.36	1.08	0.00	T	0.00	0.00	1.00	0.00	0.03	1.25	6.21	Do.
Twin Oaks	V. O.	0.12	4.73	T	1.85	0.70	0.00	....	....	.....	.....	.....	...	.....	J. F. Merriam.
Williams	R. R.	0.35	4.35	1.30	1.36	0.00	1.18	0.00	0.00	0.00	0.00	0.68	1.31	10.53	Pacific railway system.
Willows	V. O.	0.47	5.67	0.98	1.70	0.03	0.54	0.00	T	T	0.00	1.23	1.55	12.17	D. Bently.
Do	R. R.	0.17	2.77	1.16	2.78	0.00	0.00	0.00	0.00	0.00	0.00	0.95	2.17	10.00	Pacific railway system.
Woodland	R. R.	0.80	5.58	0.65	1.53	0.00	0.00	0.00	0.00	0.00	0.00	0.40	3.30	12.26	Do.
Colorado:															
Alma	S. W. S.	0.92	0.42	0.24	0.43	0.57	0.73	.....	.....	.....	.....	.....	.....	.....	W. H. Powless.
Collins, Fort	V. O.	0.36	0.23	0.45	1.10	1.28	1.96	3.07	2.12	0.54	0.43	0.20	0.00	12.19	Elwood Mead.
Colorado Springs	V. O. & S. S.	0.06	0.22	0.19	1.54	2.24	1.88	4.75	4.42	0.90	0.35	0.40	0.08	16.93	Prof. F. H. Loud and Signal Service.
Como (Ranche, near)	S. W. S.	.....	.....	.....	.....	0.45	1.16	4.78	3.11	1.12	1.08	1.00	0.52	.....	A. Reichenecker.
Denver	S. S.	0.67	0.30	0.23	2.16	1.13	0.53	2.49	2.68	0.97	0.97	0.22	0.14	12.49	Signal Service.
Georgetown	V. O.	1.07	0.11	0.60	2.11	1.17	0.35	2.60	2.21	0.84	0.67	0.32	0.86	12.71	W. A. Jayne, M. D.

Do	V. O.	1.32	0.19	0.66	2.11	1.17	0.35	2.66	2.21	0.84	0.47	0.31	0.86	13.03	Georgetown Courier.
Grand Junction	V. O.	.....	.....	.....	.....	0.34	0.20	1.60	1.48	1.93	1.13	1.09	0.88	.....	Frank McClintock.
Husted	S. W. S.	.....	0.13	.....	.....	2.86	1.60	a3.56	2.67	1.28	0.53	0.30	0.15	.....	E. P. Moon.
Idaho Springs	S. W. S.	.....	.....	.....	.....	0.31	0.52	4.26	3.29	1.27	0.64	0.31	0.43	.....	Ignatius Zeller.
Las Animas	S. S.	0.18	0.11	0.09	2.55	2.92	1.89	1.09	2.35	0.68	1.10	0.28	0.42	13.46	Signal Service.
Lewis, Fort	M. P.	0.15	0.52	0.40	1.20	0.30	1.38	7.54	2.60	2.62	0.72	1.74	1.12	20.20	U. S. post hospital.
Monte Vista	S. W. S.	0.15	.....	0.44	1.00	.....	0.62	2.06	2.06	0.40	0.02	a0.04	1.14	.....	C. S. Aldrich.
Montrose	S. S.	0.16	0.24	0.28	1.21	0.07	0.04	1.34	2.12	1.56	1.19	1.08	0.35	9.64	Signal Service.
Pike's Peak	S. S.	0.71	0.46	2.52	4.52	2.00	1.44	6.52	3.84	1.80	0.45	0.90	1.04	26.20	Do.
Pueblo	S. W. S.	.....	0.16	0.40	1.42	d3.23	1.30	.....	3.33	0.70	b0.10	.....	.....	.....	V. G. Hills, A. S. Dwight.
Saguache	S. W. S.	0.25	0.01	0.10	1.10	.....	1.02	.....	1.76	a1.05	0.40	.....	.....	.....	J. W. Rambo, M. D.
T. S. Ranche	S. W. S.	.....	.....	.....	.....	.....	0.31	.....	1.83	1.37	0.95	0.65	0.28	.....	E. A. Rider.
Connecticut:															
Canton	N. E. M. S.	5.87	5.37	3.76	3.10	0.51	6.29	7.40	5.85	2.39	2.90	2.36	4.97	50.77	G. J. Case.
a { Hartford	V. O.	5.72	5.67	.....	3.57	0.09	5.99	4.47	7.93	.....	2.39	2.80	2.91	.....	W. W. Ellsworth, J. Murtagh.
b { Hartford	N. E. M. S.	5.92	5.62	3.52	3.49	0.10	5.55	3.20	8.22	1.46	2.50	2.21	5.88	47.67	S. Hart.
Lake Konomoc	N. E. M. S.	5.54	5.92	4.35	2.99	1.72	5.53	7.23	.....	2.28	...	.....	4.96	.....	New London Water Works.
Middletown	N. E. M. S.	7.07	7.56	4.62	3.00	0.22	6.13	6.99	4.05	1.76	3.32	2.87	4.86	51.95	H. D. A. Ward.
New Hartford	N. E. M. S.	4.94	.....	3.82	.....	1.13	6.69	9.64	.....	2.63	2.30	2.03	4.11	.....	R. R. Smith.
New Haven	S. S.	4.24	6.22	4.22	2.75	0.18	5.62	4.66	4.80	2.21	3.24	2.85	3.09	44.08	Signal Service.
New London	S. S.	4.73	5.88	4.65	3.63	1.36	4.69	5.47	4.19	2.32	4.28	2.19	4.62	48.01	Do.
North Colebrook	V. O.	2.86	.....	2.76	3.54	0.37	3.84	6.65	4.42	1.61	1.12	3.56	3.63	.....	Rev. William Goodwin.
Shelton	N. E. M. S.	5.26	.....	4.25	3.28	1.45	9.54	4.16	7.63	2.12	2.37	3.48	6.50	.....	C. H. Nettleton, F. B. Wheeler.
Southington	V. O.	4.98	5.18	4.78	2.00	0.03	5.18	3.95	6.03	0.46	3.30	2.08	5.30	43.22	L. Andrews.
Uncasville	N. E. M. S.	7.53	7.06	5.45	3.78	1.89	5.58	7.26	9.50	4.43	2.82	2.54	5.26	63.61	W. H. Rathbone.
Voluntown	V. O.	7.00	6.20	3.45	3.30	2.00	5.00	5.80	3.29	2.57	2.95	2.30	5.65	49.51	Rev. E. Dewhurst.
Wallingford	N. E. M. S.	5.71	7.16	5.05	3.19	0.25	8.12	4.53	4.77	2.12	3.25	2.54	5.18	51.87	Mrs. B. F. Harrison.
Waterbury	N. E. M. S.	4.75	6.07	4.24	3.84	0.13	6.60	3.79	5.64	1.68	2.97	2.25	5.20	47.16	N. J. Welton.
Dakota:															
Abraham Lincoln, Fort	M. P.	1.18	0.40	0.90	1.24	1.80	1.20	5.30	1.84	1.68	0.55	0.75	0.90	17.74	U. S. post hospital.
Bismarck	S. S.	0.95	0.52	0.78	1.52	2.19	0.85	4.49	1.62	1.35	1.15	0.11	0.80	16.33	Signal Service.
Buford, Fort	S. S.	0.51	0.18	0.12	1.09	1.59	3.25	2.00	3.91	1.07	1.43	0.10	0.18	15.43	Do.
Deadwood	S. S.	3.18	0.74	2.01	6.47	4.25	2.16	3.70	3.22	1.75	2.05	0.48	1.65	31.66	Do.
Garden City (Henry)	V. O.	0.23	0.39	0.29	3.78	0.90	3.72	3.90	2.81	1.35	1.02	0.34	1.25	19.98	W. C. T. Newell.
Huron	S. S.	0.33	1.11	0.64	3.72	1.39	3.98	4.96	6.13	0.15	0.79	0.25	2.09	25.54	Signal Service.
Kimball	V. O.	0.70	1.35	0.40	2.75	0.60	2.05	3.40	10.15	0.15	0.30	0.20	2.60	24.65	A. S. Stuver.
Meade, Fort	M. P.	0.56	0.20	0.76	2.12	2.72	1.76	4.46	4.25	1.10	0.40	0.24	0.36	18.93	U. S. post hospital.
Parkston	V. O.	.....	1.75	0.65	3.17	1.37	2.94	5.20	10.84	0.75	0.15	0.42	2.50	.....	J. J. Swarts.
Pembina, Fort	M. P.	1.60	4.10	1.58	2.80	3.73	3.94	2.98	0.86	0.55	0.13	0.33	0.76	23.36	U. S. post hospital.
Randall, Fort	M. P.	0.24	0.58	0.20	1.14	0.31	0.88	2.90	3.49	1.68	0.36	0.74	4.21	16.73	Do.
Richardton	V. O.	2.00	1.10	2.00	3.00	3.20	2.26	5.10	2.93	1.40	1.07	0.60	3.00	27.66	Adolph Nordberg.
Sisseton, Fort	M. P.	0.40	0.46	0.42	2.80	1.87	5.82	5.50	8.07	1.02	0.94	0.19	1.37	28.86	U. S. post hospital.
Sully, Fort	S. S.	1.03	0.18	T	0.90	1.28	2.88	3.04	3.12	0.35	0.85	0.13	0.50	14.26	Signal Service.
Do	M. P.	0.25	0.40	0.34	1.45	1.37	2.36	2.77	1.04	0.20	0.55	0.02	0.48	11.23	U. S. post hospital.
Totten, Fort	S. S.	0.70	0.50	0.56	0.63	1.57	5.57	4.62	2.36	0.59	0.98	0.40	0.87	19.35	Signal Service.
Do	M. P.	1.91	0.75	0.82	0.97	1.49	5.90	5.39	2.41	0.54	0.83	0.17	1.27	22.45	U. S. post hospital.
Webster	V. O.	4.55	5.06	1.64	3.94	1.72	3.09	4.73	2.27	0.88	1.44	0.29	2.59	32.20	Arthur Betts.
Yankton	S. S.	0.43	0.64	0.26	2.45	1.28	2.48	5.00	4.46	6.70	0.74	0.57	2.07	27.08	Signal Service.
Yates, Fort	S. S.	0.47	0.36	0.35	2.24	2.09	0.57	3.59	1.94	1.31	0.37	0.15	0.87	14.22	Do.
Do	M. P.	0.86	0.86	1.70	1.02	2.12	0.97	2.19	1.03	1.72	0.74	0.19	.....	.....	U. S. post hospital.
Delaware:															
Cape Henlopen	S. S.	0.76	3.57	1.67	2.63	1.06	b2.28	.....	.....	.....	.....	.....	.....	.....	Signal Service.

Monthly and annual precipitation at Signal Service, State weather service, Military Post, Central and Southern Pacific R. R. stations, 1887—Continued.

State and stations.	Character of station.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Annual.	Authority.
District of Columbia:															
Kendall Green	V. O.	.....	2.73	2.08	2.67	2.11	.....	.....	.....	.....	1.88	1.35	3.98	.....	Deaf and Dumb Institute.
Reservoir (distributing)	V. O.	3.80	3.63	3.21	3.88	2.55	3.50	3.09	1.76	3.00	1.70	2.23	4.58	36.88	Washington Water-Works.
Reservoir (receiving)	V. O.	3.41	3.59	3.43	3.94	2.13	4.59	3.12	1.57	3.09	1.92	2.07	4.70	37.56	Do.
Washington	S. S.	2.39	3.42	3.83	3.24	2.50	2.99	3.29	2.34	3.12	1.82	1.83	4.31	35.08	Signal Service.
Florida:															
Archer	V. O.	3.52	0.38	4.14	7.75	3.29	6.39	9.72	8.37	2.51	1.19	0.37	5.65	53.28	J. C. Neal, M. D.
Cedar Keys	S. S.	1.31	0.19	1.87	6.63	4.43	8.65	g9.40	5.45	1.11	0.43	1.08	3.64	44.19	Signal Service.
Duke	V. O.	1.25	0.61	2.45	5.53	1.37	5.22	3.33	3.29	4.93	3.39	1.21	2.81	35.39	Bennett P. Ferrill.
Homeland	V. O.	2.60	0.40	1.20	1.30	3.45	12.90	4.20	3.25	2.80	4.65	1.75	2.95	41.45	J. S. Wade.
Jacksonville	S. S.	4.34	0.34	3.51	4.15	7.15	9.68	8.90	5.76	9.40	1.57	0.10	3.70	58.60	Signal Service.
Key West	S. S.	0.77	0.90	1.99	0.78	2.48	8.22	5.52	2.14	7.30	9.40	1.33	2.79	43.62	Do.
Limona	V. O.	2.07	0.53	1.51	2.49	3.09	10.29	12.50	11.17	4.26	5.66	1.35	3.42	58.34	J. G. Knapp.
Live Oaks	C. B.	.....	.....	.....	.....	7.13	4.19	7.82	4.95	1.87	1.64	.....	.....	.....	Signal Service.
Manatee	V. O.	2.40	0.48	1.63	5.07	9.69	10.88	10.15	6.18	5.97	3.65	1.61	3.20	60.91	Mary W. Broberg.
Meade, Fort	V. O.	1.20	0.65	1.20	2.15	1.65	8.08	6.75	4.25	6.27	4.00	1.96	2.50	40.66	A. H. Adams.
Merritt's Island	V. O.	2.43	1.28	1.95	8.24	2.95	6.47	3.81	6.06	11.96	8.19	1.90	1.89	57.13	Rev. James H. White.
Nama	V. O.	1.10	0.60	7.55	7.10	8.55	10.99	7.11	6.66	7.88	6.00	1.90	3.22	68.66	Charles E. Robbins.
Pensacola	S. S.	3.66	3.42	2.28	0.95	1.84	14.11	4.96	3.42	4.64	5.52	0.65	6.89	52.31	Signal Service.
Sanford	S. S.	1.32	1.10	2.22	3.19	3.22	6.12	.....	.....	.....	.....	.....	.....	.....	Do.
Saint Francis Barracks	M. P.	2.65	0.20	3.65	5.90	3.10	3.25	2.20	7.25	7.80	5.80	0.40	0.34	42.54	U. S. post hospital.
Tallahassee	V. O.	6.20	1.15	4.35	5.10	2.80	5.00	12.45	3.75	4.25	2.70	1.45	3.35	57.55	Rev. Dr. W. H. Carter.
Titusville	S. S.	.....	.....	.....	.....	.....	m4.16	7.82	2.47	6.32	12.17	0.88	1.91	.....	Signal Service.
Georgia:															
Albany	C. B.	.....	.....	.....	.....	2.95	2.85	5.87	4.60	3.15	4.62	.....	.....	.....	Do.
Allapaha	C. B.	.....	.....	.....	.....	3.35	2.64	9.69	4.66	0.43	4.32	.....	.....	.....	Do.
Athens	V. O.	2.51	4.78	2.79	1.11	3.46	4.09	14.47	7.84	1.47	2.39	0.41	5.50	50.77	Prof. L. H. Charbonnier.
Do	C. B.	.....	.....	.....	.....	2.76	4.51	15.98	7.71	1.63	3.02	.....	.....	.....	Signal Service.
Atlanta	S. S.	3.52	3.74	1.99	1.38	1.76	2.82	14.11	7.51	4.20	3.28	0.30	5.79	50.40	Do.
Augusta	S. S.	3.87	2.95	0.64	2.77	1.61	4.79	8.83	6.83	0.81	6.58	0.77	4.64	45.09	Do.
Bainbridge	C. B.	.....	.....	.....	.....	0.60	1.09	10.42	5.33	3.39	7.50	.....	.....	.....	Do.
Camak	C. B.	.....	.....	.....	.....	1.96	4.98	13.46	2.92	1.64	6.84	.....	.....	.....	Do.
Cartersville	C. B.	.....	.....	.....	.....	1.90	3.76	10.54	3.53	3.90	3.15	.....	.....	.....	Do.
Columbus	C. B.	.....	.....	.....	.....	3.60	5.11	12.59	2.84	4.16	2.92	.....	.....	.....	Do.
Eastman	C. B.	.....	.....	.....	.....	0.05	3.24	9.27	3.54	0.00	0.00	.....	.....	.....	Do.
Forsyth	V. O.	3.95	5.98	3.29	3.23	3.13	3.06	12.70	5.42	2.57	4.32	1.01	7.56	56.17	Thomas G. Scott.
Fort Gaines	C. B.	.....	.....	.....	.....	1.40	1.99	6.90	3.68	4.47	4.75	.....	.....	.....	Signal Service.
Gainesville	C. B.	.....	.....	.....	.....	2.69	3.00	7.28	13.16	3.25	2.80	.....	.....	.....	Do.
Griffin	C. B.	.....	.....	.....	.....	2.83	4.22	14.44	5.09	1.91	4.44	.....	.....	.....	Do.
Jesup	C. B.	.....	.....	.....	.....	3.35	7.64	7.74	4.29	1.29	3.36	.....	.....	.....	Do.
Macon	C. B.	.....	.....	.....	.....	4.36	3.61	6.41	2.24	2.06	3.89	.....	.....	.....	Do.

Milledgeville	V. O.	3.73	5.35	2.07	1.77	3.17	1.47	16.09	3.86	1.47	5.33	1.13	5.92	51.36	S. A. Cook.
Millen	C. B.	.....	.....	.....	.....	0.98	2.01	12.71	5.05	0.66	3.70	.....	.....	.....	Signal Service.
Newnan	C. B.	.....	.....	.....	.....	2.72	3.64	15.93	4.47	4.16	3.36	.....	.....	.....	Do.
Quitman (near)	V. O.	3.50	2.95	1.10	7.20	2.20	4.50	8.20	2.50	1.35	2.95	1.95	9.55	47.95	J. L. Cutler.
Do.	C. B.	.....	.....	.....	.....	2.25	4.20	9.84	6.75	1.60	2.57	.....	.....	.....	Signal Service.
Savannah	S. S.	3.71	3.63	0.76	2.06	2.73	10.76	4.72	1.89	1.97	4.13	0.29	7.99	44.64	Do.
Smithville	C. B.	.....	.....	.....	.....	0.40	2.12	12.01	2.40	1.80	6.20	.....	.....	.....	Do.
Thomasville	C. B.	.....	.....	.....	.....	2.68	3.58	9.27	4.23	1.89	4.66	.....	.....	.....	Do.
Toccoa	C. B.	.....	.....	.....	.....	3.09	4.32	11.66	15.26	4.29	2.94	.....	.....	.....	Do.
Union Point	C. B.	.....	.....	.....	.....	0.41	4.08	13.13	2.38	1.00	4.42	.....	.....	.....	Do.
Washington	C. B.	.....	.....	.....	.....	2.04	2.27	15.96	1.64	0.40	3.69	.....	.....	.....	Do.
Way Cross	C. B.	.....	.....	.....	.....	3.93	4.43	5.18	3.70	1.60	2.41	.....	.....	.....	Do.
Waynesborough	C. B.	.....	.....	.....	.....	4.50	3.17	8.87	2.14	0.00	3.16	.....	.....	.....	Do.
West Point	C. B.	.....	.....	.....	.....	2.12	1.87	12.26	4.31	2.99	2.47	.....	.....	.....	Do.
Idaho:															
Boisé Barracks	M. P.	2.42	0.65	1.31	0.63	0.25	1.71	0.12	0.24	0.09	T	0.04	0.78	8.15	U. S. post hospital.
Boisé City	S. S.	2.89	1.13	1.33	1.54	0.51	1.58	0.12	0.29	0.14	0.03	0.04	1.74	11.34	Signal Service.
Lewiston	V. O.	2.87	1.65	0.82	1.31	1.08	2.99	0.31	0.54	1.66	0.66	1.98	1.36	17.23	R. Schleicher.
Sherman, Fort	S. S. and M. P.	2.10	1.86	3.31	2.82	1.40	2.50	0.90	1.50	1.56	1.68	1.87	6.66	28.11	Signal Service and U. S. Post Hospital.
Illinois:															
Aledo	S. W. S.	1.54	6.12	0.80	0.70	1.68	2.05	2.81	2.02	3.13	2.88	1.60	3.52	28.25	Tyler McWhorter.
Albion	S. W. S.	0.50	4.41	5.60	5.42	2.08	3.78	3.96	.....	.....	0.81	3.55	3.59	.....	B. F. Michels.
Atwood	S. W. S.	1.53	4.56	1.36	2.20	2.71	1.64	1.09	2.50	4.72	0.70	.....	.....	.....	J. W. C. Gray.
Aurora	S. W. S.	4.36	5.86	1.06	0.82	3.02	0.58	2.34	3.79	4.33	3.47	2.21	4.25	36.09	M. M. Robbins.
Belvidere	S. W. S.	4.41	5.13	0.92	1.11	2.88	1.94	4.14	6.01	4.65	2.28	1.80	3.68	38.95	E. L. Lawrence.
Benton	S. W. S.	.....	.....	.....	3.17	1.95	1.40	1.94	1.00	1.76	0.67	3.12	3.25	.....	John McPherson.
Cairo	S. S.	2.15	4.60	2.18	2.09	1.37	2.34	1.42	1.10	1.67	0.38	3.33	4.12	26.75	Signal Service.
Cedarville	S. W. S.	2.49	5.00	1.62	0.65	1.13	1.12	1.45	6.04	4.06	2.15	0.72	4.28	30.71	John Wright.
Centralia	S. W. S.	1.21	2.87	5.97	3.51	2.57	2.34	2.22	.....	..	.....	.....	3.52	.....	J. L. Hallum.
Charleston	V. O.	1.02	3.80	3.40	2.60	3.51	0.07	0.56	2.30	3.32	0.97	7.06	4.75	33.36	J. B. Dazey.
Chicago	S. S.	3.13	5.10	0.89	0.46	1.38	1.63	1.05	3.35	4.03	2.03	2.41	3.67	29.13	Signal Service.
Collinsville	V. O.	0.60	4.60	3.80	3.99	5.26	2.37	1.77	0.84	2.33	0.75	5.01	3.46	34.78	J. L. R. Wadsworth.
Fairfield	S. W. S.	2.06	3.96	5.93	4.63	5.32	1.73	2.49	0.40	3.85	0.70	4.87	3.96	39.91	Jacob Hall.
Fairview	S. W. S.	1.43	6.12	0.38	2.06	3.30	1.37	2.18	3.85	.....	2.31	5.74	1.94	.....	Miss Mary C. Bennett.
Flora	S. W. S.	1.48	6.24	6.56	4.90	3.51	3.57	3.48	2.26	2.77	1.17	5.23	3.65	44.82	L. A. Michels.
Geneseo	V. O.	2.46	4.77	0.70	0.86	1.80	1.39	1.95	4.74	2.95	2.97	1.24	3.17	29.00	Prof. N. W. Thornton.
Gibson City	V. O.	1.40	4.10	0.90	3.20	2.20	2.75	2.20	2.90	2.50	1.10	1.87	2.12	27.24	A. C. Riebel.
Golconda	S. W. S.	2.14	5.32	2.39	2.89	2.00	2.66	1.11	1.71	5.19	0.64	4.02	1.84	31.91	J. E. Y. Hanna.
Greenville	S. W. S.	.....	.....	.....	.....	.....	2.97	2.21	1.31	4.09	1.39	6.38	4.68	.....	John B. White, M. S. Oudyn.
Griggeville	S. W. S.	1.40	4.62	1.57	2.36	2.89	1.97	2.72	0.61	4.36	0.52	2.32	4.05	29.39	L. Eastman.
Hennepin	S. W. S.	2.24	4.55	0.72	0.73	1.52	1.70	1.30	4.80	2.70	2.96	1.48	3.53	28.23	A. T. Purviance.
Hoopeston	S. W. S.	0.64	3.38	0.64	1.68	2.62	1.24	T	2.98	5.80	2.25	3.50	4.88	29.61	Miss C. J. Trego.
Irishtown	S. W. S.	1.31	4.46	4.51	3.47	4.03	2.75	2.02	0.38	3.10	1.12	7.45	4.04	38.64	William Rogan.
Jacksonville	V. O.	0.89	2.48	1.20	1.50	2.96	.....	.....	.....	.....	0.80	1.76	3.63	.....	P. J. Hasenstab, S. W. Parr.
Joliet	S. W. S.	.....	.....	.....	.....	0.97	2.07	2.47	2.72	2.96	2.95	1.85	3.97	.....	A. Nash.
Jordan's Grove	S. W. S.	1.65	.....	4.62	2.66	4.49	2.27	1.93	0.88	2.97	2.27	7.09	3.41	.....	W. J. S. Cathcart.
Kankakee	S. W. S.	1.45	4.80	0.68	0.90	1.93	1.75	1.10	2.65	.....	1.20	1.63	.....	.....	H. M. Bannister, W. M. Wells.
Lake Forest	S. W. S.	3.84	5.43	1.06	1.70	2.01	1.00	1.55	3.63	4.47	2.97	2.10	4.04	33.80	L. R. F. Griffin.
Lanark	S. W. S.	.....	.....	.....	.....	1.89	1.89	3.81	3.68	4.78	2.34	1.64	3.63	.....	Geo. S. Beeler.
Martinsville	S. W. S.	1.85	5.20	4.45	3.16	5.65	1.39	2.54	2.59	2.35	1.02	5.25	3.00	38.45	J. B. Sheapley.
Mascoutah	S. W. S.	1.58	4.70	4.80	3.40	3.80	1.50	3.50	1.20	2.70	0.76	5.50	4.20	37.64	G. Liebrock.
Mattoon	V. O.	1.30	4.25	3.20	2.93	4.72	1.03	1.30	3.23	3.10	0.97	6.84	4.10	36.97	Wm. Dozier.

Monthly and annual precipitation at Signal Service, State weather service, Military Post, Central and Southern Pacific R. R. stations, 1887—Continued.

State and stations.	Character of station.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Annual.	Authority.
Illinois—Continued:															
McLeansborough	V. O.	0.98	3.94	3.10	3.43	3.35	3.45	3.05	0.19	1.45	0.77	3.18	3.29	30.18	Wm. P. Gibbs.
Melvin	S. W. S.	1.40	4.10	0.90	3.20	2.70	2.75	2.20	2.90	2.50	1.10	.....	.....	.....	Fr. Dienelt.
Minonk	S. W. S.	0.85	4.95	0.75	1.50	2.10	0.25	0.92	2.60	.....	.....	.....	.....	.....	Cassius C. Rogers.
Monmouth	S. W. S.	.....	6.50	1.30	.....	.....	.....	5.20	.....	3.43	.....	1.30	3.61	.....	J. C. Hutchinson.
Mount Carmel	S. W. S.	0.87	.....	.....	4.52	4.29	.....	4.14	1.61	.....	0.91	.....	.....	.....	Jas. Pool.
Neponset	S. W. S.	2.46	5.88	1.33	0.66	1.21	1.55	1.39	.....	2.46	2.66	.....	.....	.....	Ezra Stetson.
North Caledonia	S. W. S.	2.10	4.20	1.60	1.95	0.80	0.43	1.52	0.50	2.50	0.60	.....	.....	.....	H. S. Blanchard.
Olney	S. W. S.	1.16	.....	6.00	5.44	4.44	.....	2.51	1.82	2.80	0.75	5.52	.....	.....	C. H. Fahs.
Oneida	S. W. S.	3.20	6.55	1.25	1.55	3.60	3.00	6.50	3.95	3.16	2.75	2.05	3.60	41.26	T. A. Wetmore.
Oquawka	S. W. S.	.....	.....	.....	.....	.....	1.25	.....	2.50	4.36	2.25	0.75	4.60	.....	R. Hodson.
Oswego	S. W. S.	2.98	4.29	0.80	0.48	2.78	0.29	1.21	2.90	2.29	2.03	1.78	3.38	25.21	J. S. Seely.
Ottawa	S. W. S.	1.82	3.25	0.64	0.39	1.08	1.27	1.17	3.06	2.77	2.80	2.17	3.33	23.75	J. O. Harris.
Pana	S. W. S.	0.65	6.08	3.41	5.68	6.50	1.66	3.05	5.25	5.08	1.33	7.58	6.41	52.68	J. K. Eberle.
Palestine	S. W. S.	1.01	4.83	4.18	3.84	5.30	1.30	1.59	2.60	2.44	0.88	4.25	3.40	35.62	J. E. Templeton.
Paris	S. W. S.	1.40	4.19	2.40	2.78	5.03	0.34	0.81	3.40	3.74	0.72	6.47	4.39	35.67	W. A. Buchanan.
Payson	S. W. S.	1.45	3.55	0.87	2.43	4.22	1.15	2.66	1.07	2.58	0.81	1.59	.....	.....	Daniel E. Robbins.
Pekin	V. O.	2.16	6.68	1.10	2.30	1.56	3.10	2.79	3.77	3.40	2.23	1.88	5.79	36.76	Rev. J. E. Terborg.
Peoria	V. O.	1.10	5.45	0.94	1.53	1.24	1.53	2.85	2.72	2.53	2.14	1.62	3.85	27.50	Dr. Fred. Brendel.
Philo	S. W. S.	0.81	2.94	2.62	3.37	5.00	1.50	0.98	2.77	4.26	1.34	2.96	4.05	32.60	Hubert A. Burr.
Pontiac	S. W. S.	0.92	3.85	1.11	1.20	1.15	0.28	0.13	1.60	1.01	0.93	0.77	3.20	16.15	Isaac Young.
Prairieville	S. W. S.	4.21	4.89	1.66	1.10	2.51	2.03	2.35	3.92	3.42	3.76	1.46	9.02	40.33	Matthias Schick.
Riley	V. O.	3.59	4.82	1.01	1.55	0.95	1.23	2.70	4.85	4.61	2.75	1.87	3.31	33.24	John W. James.
Richview	S. W. S.	1.52	4.80	5.42	3.90	3.18	2.08	2.22	4.25	2.24	1.26	5.74	4.14	40.75	A. G. Tucker.
Rockford	V. O.	4.21	6.44	1.25	0.92	1.98	0.89	3.12	4.42	3.75	2.09	1.39	5.01	35.47	Thos. D. Robertson.
Sandwich	V. O.	4.56	5.41	1.24	0.57	1.88	1.77	4.74	3.97	3.62	2.95	2.35	5.35	38.41	Nahum E. Ballou, M. D., Ph. D.
South Evanston	V. O.	4.05	4.86	1.66	0.52	2.12	1.80	1.34	2.67	3.55	2.00	2.07	3.45	30.09	Dr. M. D. Ewell.
Springfield	S. S.	1.09	4.26	1.41	2.89	1.92	3.07	1.01	1.05	2.89	0.85	1.36	3.35	25.15	Signal Service.
Sterling	S. W. S.	2.71	.....	0.35	0.38	1.08	.....	.....	.....	2.30	1.90	1.57	3.78	.....	Miss Mande Alexander.
Sumner	S. W. S.	1.20	5.40	5.50	6.30	3.70	0.80	3.00	2.70	2.80	0.70	4.60	2.70	38.90	J. A. Tyffe.
Sycamore	V. O.	3.93	4.50	0.89	1.08	0.95	1.12	3.12	3.61	3.27	2.80	1.49	3.02	29.78	Roswell Dow.
Three Mile Prairie	S. W. S.	.....	.....	4.11	.....	3.29	.....	2.40	0.21	2.47	.....	4.00	2.53	.....	W. B. Anderson.
Toulon	S. W. S.	0.91	2.73	1.05	0.46	1.00	2.61	1.05	2.25	2.51	1.05	0.85	3.20	19.67	Edwin Butler.
Vandalia	S. W. S.	0.43	2.55	4.15	.....	2.91	0.93	0.31	1.68	2.50	1.35	8.95	5.04	.....	Jos. Urbani.
Watseka	S. W. S.	1.21	5.03	1.02	2.17	1.95	2.05	2.12	3.37	2.74	1.65	2.90	4.11	30.32	Henry Upsall.
White Hall	S. W. S.	1.45	3.75	1.28	3.05	4.41	1.07	0.49	1.37	2.65	0.58	1.86	2.37	24.33	P. J. Bates.
Windsor	V. O.	1.49	3.38	2.66	2.34	4.25	1.01	2.87	2.13	2.79	0.89	5.62	4.94	34.37	A. H. Hatch.
Woodstock	S. W. S.	3.77	4.73	1.01	2.11	.....	1.48	2.09	3.34	4.31	.....	1.42	3.84	.....	Geo. D. Silliman.
Indiana:															
Angola	S. W. S.	2.07	6.26	1.44	1.12	1.95	5.24	2.00	2.79	2.64	2.22	3.43	2.59	33.75	L. Stealy.
Blue Lick	S. W. S.	.....	9.20	2.24	7.05	2.72	2.15	1.60	0.85	4.06	0.60	.....	.....	.....	G. Poindexter.

Brookville	S. W. S.	2.31	6.74	2.99	.....	.....	.....	1.09	.....	2.89	0.27	3.30	3.37	.....	A. W. Butler.
Butlerville	V. O.	3.38	8.27	3.11	5.39	5.20	4.67	0.57	1.95	3.18	0.96	3.78	3.36	43.91	Jos. Hole.
Columbia City	S. W. S.	1.48	5.72	1.01	1.60	2.38	5.98	2.83	2.59	1.35	.....	3.82	3.19	.....	Dr. N. I. Kithcart.
Columbus	S. W. S.	1.63	6.90	3.82	4.57	2.34	2.35	0.75	1.75	1.58	0.34	3.81	3.60	33.94	J. A. Perry.
Connersville	S. W. S.	2.69	6.61	2.85	5.06	4.69	4.25	2.05	2.19	2.17	0.63	3.52	4.19	40.90	R. Hessler.
De Gonia Springs	S. W. S.	2.54	7.51	2.46	4.99	3.52	1.36	2.65	0.62	1.62	0.38	4.35	4.50	36.50	Jas. P. White.
Delphi	S. W. S.	1.73	4.35	.....	2.49	4.13	1.82	1.87	3.42	3.18	1.67	4.50	3.00	.....	Higginbotham & Son.
Farmland	S. W. S.	2.50	5.01	1.89	2.73	3.88	.....	2.13	5.93	3.08	0.62	2.93	3.59	.....	W. J. Davisson.
Fort Wayne	V. O.	1.29	5.45	1.21	2.35	.....	.....	.....	.....	.....	.....	4.89	2.42	.....	F. W. Kuhne, W. F. Locum.
Franklin	S. W. S.	2.04	5.36	3.06	3.66	3.00	2.17	1.04	2.67	1.87	0.85	3.86	4.29	33.86	D. A. Owen.
Indianapolis	S. S.	1.48	4.61	2.78	3.92	2.39	2.45	1.41	3.15	2.11	0.55	3.71	4.52	33.06	Signal Service.
Jeffersonville	V. O.	3.73	8.13	1.88	7.68	2.14	1.93	1.59	2.72	3.27	0.43	2.87	3.16	39.47	John C. Loomis.
Laconia	V. O.	3.60	7.58	2.25	5.62	2.21	3.43	0.62	0.82	2.88	0.35	3.15	3.13	35.64	Lafe Crosier.
La Fayette	S. W. S.	1.18	2.94	1.41	2.94	2.11	1.97	0.88	3.08	3.02	1.62	3.72	1.95	26.82	Prof. H. A. Huston.
Lagrange	S. W. S.	0.89	6.51	1.17	.....	.....	.....	.....	2.15	.....	.....	3.50	3.75	.....	R. H. Rerrick.
Logansport	V. O.	2.85	5.15	1.81	2.10	3.90	2.95	2.65	3.25	2.50	1.90	5.21	3.80	38.07	Thos. B. Helm.
Marengo	S. W. S.	4.55	15.90	2.60	10.78	6.03	1.70	2.40	3.20	3.77	0.76	6.90	7.23	65.82	J. M. Johnson.
Mauzy	V. O.	2.02	6.28	2.97	3.86	3.68	3.36	0.69	1.50	2.38	0.61	3.81	3.79	34.95	E. Kirkwood.
Mount Vernon	S. W. S.	.....	5.97	3.14	4.26	3.24	1.29	4.00	1.83	1.79	0.28	3.82	3.73	.....	J. M. Lockwood.
Muncie	S. W. S.	2.13	5.58	2.34	4.29	5.17	2.96	2.45	2.91	3.04	0.75	3.22	3.95	38.79	T. E. Husted, A. L. Michener.
Princeton	S. W. S	1.00	3.40	1.70	2.30	6.10	0.10	1.00	0.25	2.10	1.00	3.90	5.10	27.95	Elisha Jones.
Richmond	S. W. S	2.18	2.97	2.48	4.16	3.76	2.32	2.18	3.45	1.98	0.52	3.01	3.47	32.48	J. M. Gluys.
Rockville	S. W. S.	.....	.....	.....	1.75	1.60	1.80	0.30	3.10	1.90	0.55	5.80	5.00	.....	A. C. Bates.
Salem	S. W. S.	3.25	7.60	3.25	6.87	2.85	.....	1.36	1.32	3.68	0.79	3.71	3.62	.....	Jas. W. May.
Spiceland	S. W. S.	.....	.....	1.63	2.20	4.86	3.84	1.91	3.99	2.00	0.58	3.22	4.16	.....	Wm. Dawson.
Sunman	V. O.	3.13	7.45	3.26	5.18	3.65	3.55	2.03	2.05	3.42	0.74	3.61	3.62	41.69	B. F. Ferris.
Terre Haute	S. S.	.....	.....	.....	.....	.....	1.55	0.96	3.96	2.58	0.87	5.76	4.48	.....	Signal Service.
Vevay	V. O.	4.18	8.28	2.78	7.07	3.99	1.98	2.21	2.02	3.39	0.67	3.05	3.29	42.91	Prof. Chas. G. Boerner.
Worthington	S. W. S.	0.98	6.02	3.63	3.40	3.35	0.55	2.30	3.10	1.84	1.18	4.52	4.73	35.55	Dr. W. B. Squire.
Indian Territory:															
Gibson, Fort	M. P.	0.41	0.81	1.22	1.62	2.54	1.93	0.26	2.78	3.18	2.14	1.27	.....	.....	U. S. post hospital.
Reno, Fort	S. S.	0.20	0.83	0.59	1.31	4.13	4.64	1.37	1.87	5.43	5.71	0.16	0.74	26.98	Signal Service.
Do	M. P.	0.00	.....	0.55	0.89	3.99	4.38	1.10	1.90	5.13	6.01	0.02	0.79	.....	U. S. post hospital.
Sill, Fort	S. S.	0.00	0.82	0.60	2.06	5.36	3.69	3.11	5.89	5.19	6.20	0.34	0.91	34.17	Signal Service.
Supply, Fort	S. S.	0.04	0.02	0.01	3.28	3.74	4.18	1.53	3.65	2.38	0.76	0.15	1.01	20.71	Do.
Do	M. P.	0.00	0.00	.....	1.64	2.27	2.96	1.06	2.98	2.24	0.56	0.30	0.64	.....	U. S. post hospital.
Iowa:															
Albia	V. O.	2.50	4.20	2.00	0.75	0.50	2.45	0.60	1.25	3.35	2.80	1.55	4.40	26.35	Adolph Koontz.
Auburn	V. O.	0.36	0.83	0.39	1.30	1.01	4.00	5.50	2.00	10.88	1.04	.....	1.04	.....	Edwin Miller.
Bancroft	V. O.	0.97	1.49	0.46	2.10	2.31	5.44	2.22	3.23	6.89	0.67	0.24	1.18	27.20	H. N. Renfrew.
Brookville	V. O.	.....	3.32	0.87	1.76	1.42	2.19	3.04	1.96	2.40	1.78	1.01	2.97	.....	C. Houghton.
Cedar Rapids	V. O.	2.00	4.67	3.50	0.98	1.20	2.53	4.58	1.40	4.93	2.07	0.79	2.72	31.37	H. D. Olds.
Do	V. O.	*0.45	*0.40	1.30	0.58	0.25	.....	.....	.....	4.82	2.20	0.48	.....	.....	Coe College.
Clinton	V. O.	2.52	4.20	1.32	1.21	2.72	2.45	2.95	3.84	4.44	2.73	1.71	4.22	34.31	Luke Roberts.
Creaco	V. O.	0.73	1.88	0.73	1.94	0.88	2.46	3.11	2.23	7.50	1.53	1.03	2.58	26.60	Gregory Marshall.
Davenport	S. S.	1.43	4.87	0.77	1.17	1.76	1.66	3.09	3.23	5.45	3.41	1.13	3.26	31.23	Signal Service.
Denmark	V. O.	1.56	5.40	1.01	0.72	3.32	1.43	0.87	3.03	2.30	1.93	1.12	2.94	25.63	Col. G. B. Brackett.
Des Moines	S. S.	0.83	1.65	1.79	2.48	2.31	2.25	1.94	2.66	5.36	1.40	0.52	1.41	24.60	Signal Service.
Dubuque	S. S.	3.33	3.56	1.80	1.37	2.53	1.32	2.44	4.40	7.62	2.22	0.74	3.07	34.40	Do.
Dysart	V. O.	1.75	1.75	1.35	0.60	0.55	1.50	2.30	2.20	8.10	0.76	0.50	1.85	23.21	Joseph Dysart.

* Incomplete.

Monthly and annual precipitation at Signal Service, State weather service, Military Post, Central and Southern Pacific R. R. stations, 1887—Continued.

State and stations.	Character of station.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Annual.	Authority.
Iowa—Continued.															
Elkader	V. O.	0.70	3.65	2.10	1.38	1.25	2.91	4.56	4.42	7.95	2.51	1.35	5.85	38.61	J. N. Hamilton.
Fort Madison	V. O.	1.45	5.10	1.10	0.60	4.80	1.50	1.20	3.57	3.65	2.19	0.93	1.61	27.70	Miss L. A. McCready.
Hamlin	V. O.	0.20	0.40	0.20	*1.40	0.60	2.40	1.20	2.60	1.40	0.40	0.40	1.10	12.30	Miss M. Lewis.
Humboldt	V. O.	0.75	2.50	0.00	1.50	0.75	3.78	4.23	1.24	6.75	1.03	1.05	1.78	25.36	Florence Prouty.
Ida Grove	V. O.	1.20	0.70	0.40	0.50	*0.70	1.30	2.40	3.55	6.85	*1.10	.....	.....	.....	G. C. Moorehead.
Independence	V. O.	1.25	2.35	2.02	1.86	1.06	2.00	4.42	2.71	12.87	1.25	0.83	2.44	35.06	E. F. Wilfke.
Keokuk	S. S.	1.48	5.19	0.76	1.84	2.54	1.55	1.57	2.38	3.13	1.98	1.18	2.73	26.83	Signal Service.
Logan	V. O.	0.90	0.70	0.60	1.40	1.30	2.90	2.40	4.60	4.20	0.90	1.50	2.00	22.40	J. T. Stern.
Monticello	V. O.	2.39	4.62	2.45	0.83	2.72	1.49	4.45	3.31	6.31	1.39	0.77	3.22	33.95	H. D. Smith.
Mount Pleasant	V. O.	1.47	4.63	0.51	0.93	5.26	2.23	1.38	2.18	2.44	3.05	0.55	2.48	27.11	Dr. Max E. Witte.
Muscatine	V. O.	1.88	4.12	1.14	1.26	2.26	2.10	2.90	2.40	3.49	2.24	0.98	3.53	28.30	J. P. Walton.
Nashua	V. O.	0.51	2.37	1.13	1.24	2.52	4.94	8.43	4.85	10.15	1.93	4.10	1.76	43.93	H. W. Knight.
Oskaloosa	V. O.	0.96	3.61	1.45	0.88	0.18	2.29	3.15	0.64	3.99	2.50	1.06	2.61	23.32	O. H. Avey.
Do	V. O.	1.12	0.58	0.90	.....	.....	.....	.....	.....	.....	2.38	1.28	2.00	.....	Joseph Boyd.
Sac City	V. O.	0.75	1.30	0.15	1.20	1.50	3.30	3.15	2.15	10.20	1.75	0.70	2.40	28.55	Sidney Smith.
Smithland	V. O.	0.35	0.20	0.25	0.45	3.23	3.85	2.79	3.59	8.88	0.05	0.30	0.96	24.88	Charles Rice, M. D.
Webster City	V. O.	.....	.....	.....	.....	.....	.....	2.75	0.51	11.32	0.58	0.92	0.60	.....	E. M. and George W. Lee.
Wesley	V. O.	0.70	1.10	0.90	2.50	1.30	6.45	4.50	3.60	5.15	0.70	1.05	2.30	30.25	William Ward.
Kansas:															
Allison	V. O.	0.20	0.85	T	3.29	1.16	2.27	2.92	5.08	.....	.....	.....	.....	.....	John J. Case.
Belleville	S. W. S.	.....	0.40	.....	1.69	6.46	5.55	0.22	6.19	2.46	0.63	.....	0.75	.....	A. B. Graves.
Brookville	S. W. S.	.....	0.70	T	0.80	.....	2.50	.....	.....	4.20	1.50	.....	0.80	.....	F. Coulton.
Carneiro	S. W. S.	.....	0.90	T	1.66	.....	2.97	.....	.....	a3.55	1.16	.....	.....	.....	W. H. Boyle.
Collyer	S. W. S.	.....	0.25	T	5.40	.....	1.41	.....	.....	0.80	3.00	0.25	.....	.....	E. M. Crozier, R. W. Hobert.
Concordia	S. S.	0.61	0.72	0.23	1.95	6.08	3.13	2.36	3.88	3.62	0.95	1.10	0.60	25.26	Signal Service.
Dodge City	S. S.	0.07	0.53	0.17	2.46	3.60	4.00	1.00	2.28	0.14	0.48	0.35	0.54	15.71	Do.
Dorrance	S. W. S.	0.55	1.13	.....	.....	.....	5.44	.....	.....	5.22	2.05	0.34	1.65	.....	W. H. Sweet.
El Dorado	V. O.	0.28	0.50	0.64	1.86	1.63	3.50	2.87	2.30	3.27	3.28	0.17	0.70	21.00	H. C. Ford.
Elk Falls	V. O.	.....	.....	0.57	3.83	2.88	2.36	2.61	4.68	4.48	2.01	0.85	1.78	.....	Dr. A. C. Williams.
Ellsworth	S. W. S.	.....	0.14	T	2.28	.....	1.27	.....	.....	3.80	1.00	0.10	1.00	.....	R. L. Logan, A. D. Maggart.
Emporia	S. W. S.	.....	0.61	1.20	2.56	2.29	5.80	2.18	3.92	6.00	2.84	0.84	0.73	.....	H. E. Sadler.
Eustis	S. W. S.	.....	1.10	0.17	4.78	2.52	4.12	3.89	3.56	0.85	0.91	0.67	0.25	.....	Charles E. Bennett.
Globe	V. O.	0.91	1.59	1.72	2.61	2.45	4.03	1.72	3.17	4.91	4.46	1.10	2.11	30.78	William Featherston.
Gorham	S. W. S.	.....	0.60	0.10	1.20	.....	2.90	.....	.....	0.80	1.60	0.50	.....	.....	R. G. Palmer.
Grainfield	S. W. S.	0.15	0.05	T	3.00	.....	0.86	.....	.....	2.80	0.70	0.60	0.40	.....	E. A. Lewis.
Hays, Fort	M. P.	0.40	0.70	0.10	2.23	3.02	3.29	1.06	4.64	3.34	2.32	3.35	0.90	25.37	U. S. Post Hospital.
Independence	V. O.	0.79	1.55	2.18	3.23	3.61	4.25	3.21	3.60	3.52	3.61	1.00	1.86	32.71	J. M. Altaffer.
Lawrence	V. O.	1.23	1.58	2.75	3.33	1.12	3.77	2.14	4.88	5.73	3.83	1.40	2.08	33.84	Prof. F. H. Snow.
Leavenworth	S. S.	1.27	1.94	1.59	1.99	3.07	5.43	1.36	7.11	5.73	3.87	1.14	2.55	37.05	Signal Service.
Lebo (Marydale Farm)	V. O.	.....	0.73	2.40	1.84	1.58	4.77	1.34	3.64	3.67	3.13	1.13	2.57	.....	Charles B. Jennings, C. W. Burnet.

Manhattan	V. O.	0.30	0.75	0.63	2.50	2.55	5.08	1.11	6.58	6.32	2.23	0.40	0.88	29.34	C. P. Blachly.
Do	V. O.	0.68	1.15	0.42	2.82	2.54	4.57	0.90	6.58	.....	.....	.....	.....	.....	F. J. Rogers.
Montero	S. W. S.	.....	0.05	T	4.41	.....	1.96	.....	.....	1.20	1.23	.....	.....	.....	W. S. Doyle. W. H. Moore.
Monument	S. W. S.	0.25	0.45	.....	3.96	.....	2.55	.....	.....	1.53	0.50	0.40	.....	.....	J. W. Edwards.
Morse	V. O.	.....	.....	.....	.....	.....	.....	*1.00	6.50	4.88	3.87	1.12	2.50	.....	R. P. Edgington.
Ninneeca	V. O.	0.32	0.36	0.05	3.31	2.62	1.60	2.06	4.76	1.11	1.54	0.20	1.33	19.86	E. Shaw.
Oakley	S. W. S.	0.33	1.32	.....	.....	.....	2.00	.....	.....	1.50	0.35	0.45	0.10	.....	C. M. Kaufman.
Riley, Fort	M. P.	0.14	0.36	.....	1.64	3.26	3.55	2.50	5.12	4.75	2.06	0.30	0.64	.....	U. S. Post Hospital.
Rome	S. W. S.	0.40	0.74	0.20	2.90	2.91	2.15	0.74	3.80	1.65	4.81	0.40	0.96	.....	D. M. Adams.
Salina	V. O.	2.23	1.91	0.15	2.08	3.03	5.01	2.01	6.05	3.05	1.04	0.21	0.19	26.96	John H. Gibson.
Sedan	S. W. S.	.....	1.62	1.70	4.21	.....	2.12	1.55	2.45	3.98	2.95	0.96	2.20	.....	J. W. Goodell.
Sheridan	S. W. S.	.....	0.35	0.10	6.50	.....	3.25	.....	.....	.....	2.30	0.20	.....	.....	H. G. Adams, W. H. Parker.
Topeka	S. S.; S. W. S.	.....	1.72	.....	2.53	2.03	9.57	1.06	5.39	4.67	3.39	1.21	0.89	.....	*Bertie E. Lovewell, and Signal Service.
Victoria	S. W. S.	0.30	0.40	.....	3.10	.....	2.00	.....	.....	3.00	1.50	1.00	0.40	.....	W. L. Holt.
Wakefield	V. O.	0.39	1.45	1.68	1.47	5.08	4.49	1.58	6.89	9.43	2.01	0.70	2.89	38.06	William P. Cochran.
Wellington	V. O.	0.48	1.18	0.22	3.23	3.21	2.43	3.45	5.07	2.50	6.06	0.18	0.83	28.84	John H. Wolfe.
Wilson	S. W. S. & V. O.	.....	0.68	T	2.30	1.32	3.78	0.97	6.47	3.22	0.57	1.60	0.27	.....	P. S. Cross, E. Dollenmayer.
Yates Center	V. O.	0.44	1.29	1.32	2.48	2.47	4.50	4.62	2.19	3.58	1.91	6.39	1.13	26.32	F. R. Gray.
Kentucky:															
Bowling Green	V. O.	.....	.....	.....	2.96	.....	.....	2.56	1.99	3.73	0.68	2.60	2.56	.....	M. H. Crump.
Frankfort	V. O.	4.30	9.43	2.88	6.29	5.00	2.40	3.17	2.06	5.68	0.31	3.17	3.66	48.35	E. C. Went.
Harper's Ferry	V. O.	2.08	4.60	6.80	9.00	3.20	1.33	2.42	0.78	.....	.....	.....	.....	.....	E. G. Harper.
Louisville	S. S.	4.08	7.60	1.88	7.31	2.12	1.79	1.86	2.74	2.84	0.39	2.51	3.03	38.15	Signal Service.
Midway	V. O.	3.99	10.11	2.77	5.47	4.23	0.55	.....	.....	.....	.....	.....	.....	.....	Dr. M. E. Poynter.
Louisiana:															
Alexandria	C. B.; S. W. S.	2.36	4.39	4.58	2.86	5.43	4.00	5.43	3.96	2.59	6.54	1.99	6.73	50.56	L. C. Giffe.
Amite City	C. B.	.....	.....	.....	.....	4.08	8.89	5.91	2.30	3.85	4.84	.....	.....	.....	Signal Service.
Cheneyville	C. B.	.....	.....	.....	.....	2.54	1.44	2.49	2.34	2.38	2.80	.....	.....	.....	Do.
Coushatta	C. B.; S. W. S.	4.08	3.84	1.05	0.53	5.42	4.14	7.62	4.08	3.61	3.24	2.05	9.14	48.80	L. M. Howard.
Delhi	S. W. S.	6.10	2.00	1.80	1.10	3.75	.....	11.25	1.20	1.00	3.70	2.40	6.00	.....	Rev. T. D. Cleland.
Girard	S. W. S.	.....	.....	0.71	1.02	5.11	4.38	9.39	1.52	3.11	4.45	.....	6.83	.....	J. P. Gray.
Grand Coteau	V. O.	2.57	2.37	2.28	1.77	6.50	6.73	6.63	1.88	4.57	2.70	1.86	7.80	47.66	Rev. C. M. Widman, S. J.
La Fayette	C. B.	.....	.....	.....	.....	6.01	9.44	3.87	3.74	6.96	4.38	.....	.....	.....	Signal Service.
Liberty Hill	V. O.	2.52	2.37	2.00	0.85	5.52	4.30	11.15	3.27	2.74	2.37	2.57	7.48	47.14	E. A. Crawford.
Mandeville	S. W. S.	3.91	8.16	1.71	1.55	4.40	.....	4.16	3.84	4.28	8.35	1.37	7.33	.....	A. Bund.
Minden	C. B.	.....	.....	.....	.....	4.40	5.18	5.34	0.59	2.37	2.83	.....	.....	.....	Signal Service.
Monroe	C. B.; S. W. S.	2.67	2.68	2.94	0.96	4.69	4.55	12.27	1.55	3.55	4.52	2.21	6.96	49.55	Signal Service, E. H. Winder, and W. W. Renwick.
Natchitoches	C. B.	.....	.....	.....	.....	5.01	4.87	7.11	4.60	3.83	4.91	.....	.....	.....	Signal Service.
New Orleans	S. S.	4.26	5.58	3.37	1.87	3.99	11.33	7.85	7.42	6.51	4.71	0.52	7.56	64.97	Do.
Opelousas	C. B.	.....	.....	.....	.....	5.46	5.57	4.58	3.03	3.28	2.44	.....	.....	.....	Do.
Shreveport	S. S.	3.26	3.31	1.28	0.44	5.15	4.00	3.85	2.07	3.64	3.05	5.45	6.72	42.22	Do.
Thibodeaux	S. W. S.	3.97	3.88	3.00	2.38	3.43	14.19	6.52	4.96	5.13	7.02	0.00	6.78	61.35	Maj. S. T. Grisamore.
West Melville	S. W. S.	4.82	2.63	2.38	2.09	7.12	7.45	7.03	1.64	3.58	4.13	1.20	6.11	50.18	
Maine:															
Bar Harbor	V. O.	8.22	7.29	5.03	4.81	1.11	2.58	3.48	6.61	0.60	3.53	3.85	5.11	52.22	Joseph Wood.
Cornish	V. O.	4.34	4.57	3.55	5.26	2.13	4.32	5.85	2.52	0.67	2.04	4.92	3.04	43.21	Silas West.
Eastport	S. S.	7.78	3.74	4.46	2.92	2.57	6.01	4.51	3.56	1.05	2.45	2.32	5.50	46.96	Signal Service.
Fairfield	N. E. M. S.	2.39	2.62	2.05	3.64	0.41	2.84	8.77	2.98	1.11	1.98	3.48	3.44	35.66	H. M. Mansfield.
Gardiner	V O.	7.32	5.62	7.27	6.87	1.08	3.42	6.96	3.42	1.05	2.44	3.64	5.61	54.70	Rev. Charles L. Wells.

Monthly and annual precipitation at Signal Service, State weather service, Military Post, Central and Southern Pacific R. R. stations, 1887—Continued.

State and stations.	Character of station.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Annual.	Authority.
Maine—Continued.															
Kent's Hill	V. O.	3.86	6.33	3.36	5.27	0.47	3.13	.....	.....	0.65	2.45	3.99	4.25	.....	W. C. Strong.
Lewiston	N. E. M. S.	3.99	5.28	4.60	5.18	1.14	2.81	5.73	3.77	0.88	*2.42	5.09	5.73	46.62	Union Water Power Company.
Mayfield	N. E. M. S.	.....	.....	.....	5.91	2.08	4.01	6.53	3.35	1.41	2.74	4.27	.....	.....	V. P. Hall.
Orono	V. O.	7.56	5.89	5.88	5.08	1.25	3.36	7.11	4.60	0.95	3.00	3.48	4.72	52.88	M. C. Fernald.
Portland	S. S.	3.89	5.73	4.15	4.96	1.93	4.07	4.70	6.56	0.70	2.47	4.74	5.17	49.07	Signal Service.
Maryland:															
Baltimore	S. S.	2.57	4.69	3.49	2.44	2.57	4.44	8.32	4.15	2.80	1.06	2.02	5.04	43.59	Do.
Cumberland	V. O.	0.30	4.38	1.57	2.61	5.64	3.87	5.59	1.12	3.68	0.39	0.81	3.00	32.97	E. T. Shriver.
Fallston	V. O.	2.72	4.46	3.61	2.51	2.51	5.14	5.39	5.99	4.26	1.37	2.02	6.40	46.38	Prof. G. G. Curtiss.
Great Falls	V. O.	2.19	3.02	4.10	2.12	2.13	3.39	4.68	2.38	3.03	1.49	1.53	3.00	33.06	Washington Water Works.
McDonogh	V. O.	2.72	2.84	2.36	2.50	4.20	4.16	4.11	3.34	4.09	1.13	1.11	3.85	36.41	N. Stubbs.
McHenry, Fort	M. P.	0.93	2.47	1.67	0.95	5.62	5.31	6.26	5.63	1.57	0.53	0.66	2.68	34.28	U. S. post hospital.
Mount Saint Mary	V. O.	2.29	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	Mount Saint Mary's College.
New Midway	V. O.	2.02	4.55	1.97	2.62	6.12	3.84	6.21	2.74	4.18	1.08	1.19	6.05	42.57	George F. Smith.
Woodstock	V. O.	0.49	3.50	3.24	2.55	4.05	3.78	4.43	4.00	4.12	1.19	1.18	4.19	36.72	Woodstock College.
Massachusetts:															
Amherst	V. O.	4.57	5.05	4.05	2.98	1.13	5.09	8.93	7.75	1.22	2.10	3.35	4.11	50.33	Agricultural Experimental Station.
Do	V. O.	4.83	4.96	4.18	2.78	0.75	5.46	10.50	8.72	1.42	2.21	3.54	3.47	52.82	Miss S. C. Snell.
Blue Hill (base)	V. O.	6.36	5.48	5.63	4.44	2.36	2.71	4.91	3.89	1.38	2.76	2.69	3.36	45.86	A. L. Roteh.
Blue Hill (summit)	V. O.	5.19	5.29	4.93	3.97	2.54	2.74	5.01	3.67	1.00	2.69	2.55	4.14	43.72	Do.
Boston	S. S.	4.86	3.69	3.86	2.62	1.67	1.98	3.50	3.05	0.97	2.53	2.22	2.71	33.75	Signal Service.
Do	N. E. M. S.	5.93	4.37	5.27	4.35	1.69	2.15	3.92	3.21	1.24	2.84	2.59	3.59	41.15	Boston Water Works.
Cambridge	V. O.	7.04	4.96	5.65	5.46	1.70	1.90	4.18	3.73	1.12	3.36	2.87	3.71	45.68	Harvard College Observatory.
Do	N. E. M. S.	5.28	4.66	4.46	3.94	1.79	1.86	4.19	4.10	1.36	.....	3.90	4.22	.....	E. C. Brooks.
Chestnut Hill	N. E. M. S.	5.57	4.44	5.20	4.74	1.69	2.08	3.69	3.53	1.35	3.21	2.75	3.66	41.91	Boston Water Works.
Chicopee	N. E. M. S.	4.37	4.70	3.05	3.83	0.90	6.32	8.24	8.69	1.64	1.34	3.34	3.69	50.11	F. H. Norton.
Clinton	N. E. M. S.	4.72	4.44	4.40	3.00	1.50	.....	5.55	9.80	0.62	2.30	2.78	3.98	.....	G. W. Weeks.
Concord	N. E. M. S.	6.16	4.61	5.33	4.40	1.27	2.60	5.56	7.21	1.24	3.02	3.03	4.48	48.91	J. O. Haskell.
Cotuit	N. E. M. S.	4.39	5.59	4.49	4.98	2.18	2.39	2.99	4.50	1.82	2.10	2.92	4.58	42.93	J. H. Reed.
Dalton	N. E. M. S.	3.00	2.87	3.30	1.97	0.78	4.09	4.07	7.94	2.21	.....	1.62	3.97	.....	O. B. Hayes.
Deerfield	V. O.	4.18	4.70	5.59	4.93	1.52	5.81	10.66	6.54	1.79	2.58	3.56	4.50	56.36	Rev. A. Hasen.
Dudley	V. O.	3.50	4.45	3.30	3.15	0.99	2.78	10.49	3.45	1.84	2.39	2.44	3.94	42.72	Rollin U. Tyler.
Edgartown	S. S.	3.20	4.08	1.73	4.30	2.14	2.25	2.96	5.54	1.45	1.88	2.59	1.78	33.90	Signal Service.
Fall River	V. O.	7.38	4.98	4.35	4.72	2.60	4.18	4.30	3.75	1.30	2.79	2.53	4.55	47.42	C. V. S. Remington.
Do	N. E. M. S.	.....	.....	.....	.....	2.58	4.70	2.22	4.01	2.58	3.28	3.02	5.10	.....	P. Kieran.
Fitchburg	N. E. M. S.	6.12	5.04	4.79	4.84	2.77	3.34	7.23	9.38	2.45	1.99	3.39	4.04	55.38	J. Fisher.
Do	N. E. M. S.	4.93	5.45	4.31	5.09	2.70	3.47	7.09	9.77	3.30	2.68	3.63	4.26	56.18	A. P. Mason.
Framingham	N. E. M. S.	5.20	5.07	4.96	4.60	1.11	2.42	3.81	4.62	1.29	2.87	2.64	3.94	42.53	Boston Water Works.
Gilbertville	N. E. M. S.	6.68	5.78	5.19	.....	.....	4.05	6.06	5.08	1.51	2.75	3.52	4.09	.....	W. E. Brown.
Groton	N. E. M. S.	.....	4.45	5.03	4.66	2.22	3.12	6.09	10.00	2.28	2.36	3.15	3.84	.....	Charles Woolley.

Groton	N. E. M. S.	6.02	5.01	3.55	3.39	2.48	..	.....	.....	2.13	2.35	3.23	.....	.....	R. B. Potter.
Lake Cochituate	N. E. M. S.	5.39	5.34	5.10	4.45	1.12	2.48	3.67	3.70	1.28	2.49	2.76	3.83	41.61	Boston Water Works.
Lawrence	N. E. M. S.	5.75	4.77	4.46	0.84	1.72	2.22	3.68	10.23	3.26	2.93	3.25	4.06	47.17	Essex Company.
Leominster	N. E. M. S.	4.94	4.68	4.15	4.31	2.58	2.86	6.40	8.49	2.55	2.20	3.52	3.99	50.67	W. B. Hosmer.
Long Plain	N. E. M. S.	5.71	5.80	5.65	0.85	2.82	3.51	2.68	3.22	1.01	4.56	3.19	4.92	43.92	New Bedford Water Works.
Lowell	N. E. M. S.	5.72	5.18	3.40	4.05	1.64	2.61	5.42	10.93	2.23	3.12	3.27	4.55	52.12	Prop. Locks and Canals.
Ludlow	N. E. M. S.	5.62	4.85	4.92	2.76	0.85	5.88	5.67	7.30	1.45	2.05	3.44	4.31	48.60	M. W. Graves.
Lynn	N. E. M. S.	6.20	4.98	5.50	5.24	1.69	2.24	5.89	5.84	1.22	2.92	3.09	4.05	48.86	D. Walden.
Manchester	N. E. M. S.	.....	.....	.....	.....	2.04	2.71	3.70	6.17	1.14	2.62	.....	5.62	.....	T. J. Coolidge.
Mansfield	N. E. M. S.	.....	5.80	6.24	4.39	2.67	4.68	5.43	5.88	2.00	2.84	2.40	.....	.....	J. H. White.
Medford	N. E. M. S.	6.03	4.67	4.75	3.55	1.57	2.02	4.45	3.67	1.23	3.16	2.96	3.72	41.78	R. M. Gow.
Middleborough	N. E. M. S.	6.19	4.51	5.17	5.49	2.76	3.08	3.23	5.12	0.98	2.85	2.33	3.62	45.33	Middleborough Water Works.
Milton	N. E. M. S.	4.54	4.02	5.10	3.78	2.39	2.24	4.61	3.83	1.63	2.73	2.41	3.72	41.20	Rev. A. K. Teele.
Monson	N. E. M. S.	5.70	4.37	4.56	3.15	0.79	4.11	6.27	7.98	1.48	2.33	3.19	3.92	47.85	G. E. Fuller.
Mount Nonotuck	N. E. M. S.	6.36	5.33	4.32	4.23	1.13	5.84	7.28	7.89	1.71	2.20	3.61	5.06	54.96	W. Street.
Mystic Lake	N. E. M. S.	5.22	4.43	5.04	4.52	1.75	2.69	6.43	5.17	1.54	3.06	2.94	3.72	46.51	Boston Water Works.
Mystic Station	N. E. M. S.	4.66	4.12	4.60	4.02	1.42	1.92	4.62	4.08	1.25	3.03	2.92	3.51	40.15	Do.
Nantucket	S. S.	2.97	3.97	2.84	6.23	1.75	2.12	2.10	4.35	1.99	1.81	2.54	4.60	37.27	Signal Service.
Do	N. E. M. S.	3.14	5.19	4.16	7.17	1.94	3.15	1.70	5.02	2.21	2.00	3.17	4.96	43.81	H. Paddack.
New Bedford	V. O.	5.99	6.73	5.69	5.46	2.15	3.02	3.58	6.61	1.68	3.83	2.65	4.27	51.73	Thomas R. Rodman.
Do	N. E. M. S.	7.18	5.64	4.74	4.98	2.27	3.22	2.92	4.94	1.81	3.73	2.63	4.05	48.11	New Bedford Water Works.
Newburyport	V. O.	5.82	6.18	5.24	4.99	1.34	2.34	4.35	7.57	1.76	3.10	3.90	3.62	50.21	F. V. Pike.
Do	N. E. M. S.	3.55	5.35	3.40	3.84	1.22	2.47	4.06	7.27	1.77	2.44	3.78	2.79	41.94	Newburyport Water Co.
Northampton	N. E. M. S.	6.66	5.85	5.33	4.32	1.73	4.91	8.91	6.73	1.74	2.35	3.83	5.51	57.87	J. M. Clark.
North Truro	V. O.	4.14	4.15	2.71	3.96	2.15	*2.30	3.03	6.38	0.28	1.51	2.20	4.40	37.21	John R. Smith.
Plymouth	N. E. M. S.	5.91	4.15	5.06	5.26	2.16	3.01	1.65	5.07	1.57	2.97	3.14	4.51	44.46	Miss L. B. Knapp.
Princeton	N. E. M. S.	.....	.....	5.82	3.53	1.60	3.55	7.27	8.98	1.89	2.15	3.24	3.35	.....	Mrs. J. O. West. M. Grimes.
Randolph	N. E. M. S.	6.96	4.83	6.27	4.23	2.27	1.92	3.59	.....	.....	3.08	2.71	3.82	.....	F. C. Granger.
Rowe	N. E. M. S.	7.30	7.25	3.60	3.32	1.35	6.40	6.05	6.60	1.45	2.21	3.55	4.65	53.73	J. Davis.
Salem	N. E. M. S.	5.65	4.50	5.45	.....	1.64	2.18	3.70	5.68	0.79	2.82	3.16	3.69	.....	A. A. Smith, J. P. Andrews.
Somerset	V. O.	6.08	3.92	5.03	4.29	3.12	4.03	4.15	4.61	1.46	2.64	2.37	3.93	45.63	Elisha Slade.
South Hingham	N. E. M. S.	7.34	5.00	5.12	4.62	2.49	3.49	5.22	3.62	1.24	2.98	2.46	4.67	48.25	H. W. Cushing.
Springfield	N. E. M. S.	4.85	5.28	4.19	3.43	1.02	6.44	6.61	7.69	1.84	1.96	3.31	3.81	50.38	E. C. Wheeler, S. C. Allen.
Taunton	N. E. M. S.	6.09	3.64	4.16	3.47	2.40	2.98	6.65	5.31	1.68	3.12	2.36	4.42	46.28	A. F. Sprague.
Do	V. O.	7.33	4.93	4.79	4.44	2.39	3.81	6.25	5.15	1.71	2.93	2.32	4.31	50.36	Dr. E. U. Jones.
Do	N. E. M. S.	7.15	4.52	5.17	5.32	2.70	4.08	6.20	5.17	1.84	3.08	2.37	4.02	51.62	Taunton Water Works.
Vineyard Haven	S. S.	4.24	4.83	2.98	4.08	1.72	2.29	3.62	8.90	2.73	1.65	2.54	3.53	43.11	Signal Service.
Waltham	N. E. M. S.	5.99	4.66	5.23	4.76	1.62	2.97	4.58	4.64	1.59	2.91	2.87	4.13	45.95	Boston Manufacturing Co.
Wellesley	N. E. M. S.	7.10	4.52	5.06	3.86	1.32	3.92	5.25	.....	1.36	2.88	1.98	4.08	.....	Miss S. F. Whiting.
Westborough	V. O.	4.85	4.49	4.35	3.36	1.27	2.88	3.71	5.94	1.35	2.80	2.70	3.85	41.55	G. S. Newcomb.
Williamstown	V. O.	6.29	4.50	5.15	3.23	1.31	4.33	10.82	7.03	2.30	1.13	3.77	.....	.....	College Observatory.
Winchester	N. E. M. S.	5.27	4.51	4.96	4.69	1.63	2.71	6.74	4.76	1.46	3.02	3.16	3.43	46.34	Boston Water Works.
Wood's Holl	S. S.	.....	.....	3.00	4.42	1.91	4.03	2.93	10.84	1.99	2.21	2.84	4.59	.....	Signal Service.
Michigan:															
Adrian	S. W. S.	.....	6.11	1.25	1.17	2.65	4.41	1.44	2.09	6.66	2.03	3.20	2.77	.....	W. H. Howard.
Alma	S. W. S.	.....	m1.76	1.26	1.63	2.18	1.87	1.81	3.14	.....	3.82	2.37	3.81	.....	P. M. Smith.
Alpena	S. S.	5.02	4.60	1.22	2.66	2.63	2.20	5.16	1.09	2.14	3.88	2.71	4.57	37.88	Signal Service.
Athens	S. W. S.	.....	.....	.....	1.55	3.05	4.67	1.05	1.89	3.69	.....	.....	.....	.....	E. H. Coller, M. D.
Benton Harbor	V. O.	a3.56	6.05	1.61	0.62	3.35	1.08	0.56	3.46	.....	.....	.....	.....	.....	A. J. McClave.
Big Rapids	S. W. S.	.....	.....	.....	.....	1.10	2.49	.....	3.89	4.40	3.52	2.07	5.39	.....	F. R. Fowler.

*Incomplete.

Monthly and annual precipitation at Signal Service, State weather service, Military Post, Central and Southern Pacific R. R. stations, 1887—Continued.

State and stations.	Character of station.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Annual.	Authority.
Michigan—Continued.															
Birmingham	V.O.	a1.54	4.50	1.23	1.28	1.95	2.91	1.27	1.72	4.22	2.83	1.85	3.22	28.52	S. Alexander.
Brady, Fort	M.P.	1.63	1.20	0.69	2.87	1.07	2.02	4.18	0.54	1.86	4.07	1.62	0.40	22.15	U. S. post hospital.
Buchanan	S. W. S.	.....	.....	.....	.....	5.35	5.72	.....	.....	4.01	3.99	3.74	5.66	.....	V. E. David, C. F. Howe.
Calumet	S. W. S.	.....	.....	.....	.....	.....	.....	4.51	1.93	0.87	3.36	2.46	2.33	.....	E. S. Grierson.
Cassopolis	S. W. S.	.....	.....	1.17	0.75	4.28	1.73	0.64	3.34	3.70	3.71	2.61	3.79	.....	H. J. Webb.
Central Mine	S. W. S.	.....	.....	.....	.....	1.47	1.83	.....	0.66	2.10	4.01	6.36	3.63	.....	E. T. W. Daume.
Charlevoix	S. W. S.	.....	.....	.....	.....	0.84	4.00	2.79	0.50	1.00	2.96	m1.04	1.27	.....	E. F. Parmalee, A. Buttars.
Detroit	S. S.	1.91	4.16	1.44	1.19	2.11	4.19	1.31	2.30	4.41	1.49	2.72	2.34	28.97	Signal Service.
Escanaba	S. S.	1.15	1.41	0.31	2.65	0.73	2.27	4.14	1.44	1.13	3.07	0.98	3.73	23.01	Do.
Ganges	S. W. S.	.....	.....	0.43	0.97	1.66	1.11	0.85	1.57	4.36	2.43	.....	.....	.....	Edward Hawley.
Gaylord	S. W. S.	.....	.....	.....	.....	2.20	3.26	3.67	0.09	1.27	6.88	2.67	3.00	.....	Dr. J. Robinson, F. A. Baldwin.
Grand Haven	S. S.	4.40	4.48	0.95	1.09	2.91	0.55	2.94	2.26	4.71	2.78	1.72	3.96	32.75	Signal Service.
Grand Rapids	S. W. S.	.....	3.28	1.25	0.60	1.69	1.14	.....	.....	4.79	2.59	2.19	3.47	.....	F. M. Kendall.
Greenville	S. W. S.	.....	m4.67	1.73	1.33	2.27	1.63	3.57	1.27	2.98	2.64	2.78	2.50	.....	Sprague Brothers.
Harrisville	V. O.	4.50	4.30	1.85	2.18	2.17	2.52	4.98	2.35	1.34	5.14	2.07	1.23	35.63	D. W. Mitchell, M. D.
Hart	S. W. S.	.....	.....	.....	.....	1.30	0.43	1.10	3.37	5.32	3.10	1.45	4.78	.....	F. H. Edwards.
Hastings	S. W. S.	.....	.....	.....	.....	.....	0.88	1.31	1.80	5.76	2.60	2.61	4.03	.....	John Bessner, F. R. Timmerman.
Hudson	V. O.	1.05	6.05	2.83	1.24	2.84	4.99	3.10	2.34	4.28	2.86	3.09	2.15	36.82	Maj. A. H. Boies.
Jonesville	S. W. S.	.....	.....	1.75	1.01	2.03	4.13	1.98	1.78	4.36	3.59	3.04	2.91	.....	R. S. Munsell, R. Y. Coryell.
Kalamazoo	V. O.	2.28	4.85	1.35	1.33	4.01	5.64	0.79	1.69	4.69	2.41	2.18	3.26	34.48	William A. Black.
Lansing	S. S.	3.88	5.91	1.96	1.02	1.75	1.88	1.55	0.89	5.21	2.30	1.96	3.16	34.49	Signal Service.
Do	V. O.	3.36	5.87	1.30	0.98	2.12	1.45	1.68	0.93	5.53	2.28	2.06	2.52	30.08	Dr. H. B. Baker.
Mackinaw City	S. S.	0.86	1.87	0.22	1.46	1.49	1.11	2.38	0.28	1.65	1.59	1.09	1.08	15.08	Signal Service.
Marquette	S. S.	1.96	1.36	0.31	3.44	1.04	3.15	2.62	2.90	1.06	2.43	3.03	2.32	25.62	Do.
Marshall	V. O.	1.88	6.33	1.00	0.91	2.44	2.02	2.16	2.59	3.84	3.15	2.34	3.09	32.25	W. T. Drake.
Mottville	V. O.	1.63	6.38	0.75	0.38	2.62	4.25	1.18	2.58	3.68	3.55	2.70	3.15	33.90	J. A. Hartsler.
Mount Morris	S. W. S.	.....	.....	.....	.....	.....	.....	1.39	2.74	2.37	2.26	1.93	2.81	.....	Dr. H. H. Bardwell.
Olivet	S. W. S.	.....	.....	.....	.....	.....	1.96	2.55	2.01	4.36	2.95	2.08	2.87	.....	H. C. Bumpus.
Ovid	S. W. S.	.....	.....	1.60	0.90	2.40	2.70	.....	.....	o0.60	2.01	2.25	2.88	.....	W. H. Faxon.
Petersburgh	S. W. S.	.....	.....	.....	.....	1.94	4.02	3.66	2.68	4.24	2.23	3.61	2.87	.....	S. L. Jones.
Port Huron	S. S.	2.03	4.86	1.20	0.80	2.24	2.44	1.47	1.87	2.48	1.42	1.79	2.22	24.82	Signal Service
Romeo	S. W. S.	.....	.....	.....	.....	.....	d1.12	0.35	2.35	2.34	1.71	2.21	2.18	.....	O. D. Thompson.
Saint John's	S. W. S.	.....	.....	2.35	0.46	.....	.....	0.82	2.00	5.90	2.21	2.63	3.06	.....	Dewit H. Hunt, A. O. Hunt.
Saint Louis	S. W. S.	.....	m1.88	1.17	1.66	2.30	1.46	1.69	2.74	3.65	3.93	2.52	3.41	.....	R. H. Scoville.
Saginaw High School	S. W. S.	.....	m1.48	1.30	1.70	1.81	.....	.....	.....	.....	.....	2.20	2.20	.....	W. H. Sherzer.
Sand Beach	S. W. S.	.....	.....	.....	.....	2.25	3.66	1.66	1.49	1.16	3.22	1.13	1.81	.....	N. P. Arnold.
Snowflake	S. W. S.	.....	.....	.....	.....	.....	.....	3.48	0.58	1.56	5.74	1.49	3.46	.....	W. W. Johnson.
Swartz Creek	V. O.	2.62	5.49	1.64	1.56	1.71	2.05	2.02	2.79	.....	.....	.....	.....	.....	George G. Gordon, M. D.
Thornville	V. O.	2.30	3.56	1.85	1.46	4.30	2.57	1.75	3.11	3.44	2.01	2.26	2.13	30.74	John S. Caulkins, M. D.
Traverse City	V. O.	4.66	5.94	2.27	0.96	0.74	3.65	2.70	1.66	0.61	4.09	1.92	3.84	33.06	S. E. Wait.

Minnesota:															
Albert Lea	S. W. S.	0.96	0.77	0.28	1.43	0.71	3.51	3.25	3.82	4.32	0.80	.....	.....	.....	R. B. Abbott.
Delano	S. W. S.	.....	.....	0.13	3.23	1.22	3.02	1.79	7.06	3.17	1.87	0.67	3.92	.....	A. W. Wittman.
Duluth	S. S.	1.88	0.81	0.55	1.58	4.98	2.71	4.17	1.53	2.68	3.34	1.99	2.65	28.56	Signal Service.
Excelsior	S. W. S.	2.25	1.36	0.32	.....	j1.47	5.28	2.33	6.10	2.65	.....	0.44	3.91	.....	Dr. James R. Walker.
Mankato	S. W. S.	1.15	2.62	0.37	1.86	1.38	2.96	3.34	c2.47	b2.31	0.57	1.12	3.40	22.95	Prof. H. P. Cushing.
Minneapolis	V. O.	1.37	2.22	0.71	3.76	2.50	3.17	3.49	4.17	4.17	2.45	0.89	3.80	32.79	William Cheney.
Moorhead	S. S.	0.48	0.58	0.26	2.45	2.57	3.77	0.40	1.45	0.30	1.40	0.57	1.74	21.97	Signal Service.
Morris	S. W. S.	0.65	0.20	0.36	1.70	1.57	4.16	2.25	2.61	3.07	1.24	0.30	3.35	21.56	D. T. Wheaton.
Northfield	S. W. S.	1.01	2.02	0.18	2.45	1.03	3.04	2.59	4.89	2.79	1.13	0.69	b1.42	23.24	M. D. Snedicor, E. L. Porter.
Park Rapids	S. W. S.	0.89	0.65	.....	1.43	.....	5.51	f3.80	1.25	.....	e1.89	0.35	.....	.....	P. A. Walling, M. D.
Pine River Dam	S. W. S.	.....	.....	0.28	1.03	1.99	4.60	5.94	2.27	0.36	3.02	0.36	1.87	.....	N. McKay, M. Johnson.
Pokegama Falls	S. W. S.	.....	.....	.....	.....	3.79	5.36	5.29	2.37	1.58	2.81	.....	2.65	.....	Olof Johnson.
Red Wing	S. W. S.	1.22	1.71	0.43	2.52	0.99	5.24	3.58	6.79	5.04	1.58	0.73	3.67	33.41	Prof. O. Whitman.
Rochester	S. W. S.	0.66	2.06	0.31	3.41	1.56	5.21	2.08	5.09	4.95	2.11	.....	2.10	.....	Charles N. Ainslie.
Rolling Green	S. W. S.	.....	.....	0.03	4.10	1.71	2.00	2.50	2.60	3.00	0.78	1.00	2.61	.....	Capt. F. Wherland.
Saint Paul	S. S.	1.79	0.89	0.33	3.14	1.60	2.89	3.89	3.87	4.35	1.48	0.65	1.47	25.85	Signal Service.
Saint Vincent	S. S.	0.88	0.83	0.48	1.43	3.57	4.15	4.28	1.68	0.45	0.16	0.22	0.54	18.47	Do.
Snelling, Fort	M. P.	0.80	1.38	0.85	3.90	2.14	5.20	3.10	5.19	3.35	1.30	0.43	1.62	29.17	U. S. Post Hospital.
Spring Valley	S. W. S.	0.75	1.00	0.44	3.06	1.12	1.77	2.00	3.56	5.55	1.88	1.11	2.40	24.64	B. F. Farmer.
Tracy	S. W. S.	.....	.....	.....	.....	.....	.....	0.51	1.46	2.36	1.00	0.12	1.53	.....	E. O. Brauns.
Winona	S. W. S.	0.50	.....	0.25	1.62	e0.50	.....	.....	.....	.....	f0.68	0.35	.....	.....	Prof. J. M. Holtsinger.
Mississippi:															
Aberdeen	C. B.	.....	.....	.....	.....	2.30	1.71	4.71	2.23	1.50	2.90	.....	.....	.....	Signal Service.
Artonish Plantation	S. W. S.	4.19	4.48	1.39	1.52	3.86	6.79	3.57	3.34	2.52	4.91	0.75	7.76	45.49	B. P. Swan, W. D. Swan.
Bateseville	C. B.; S. W. S.	.....	4.16	5.36	2.29	2.69	1.20	1.56	1.64	2.12	3.06	2.04	5.07	.....	Signal Service and H. Harris.
Biloxi	V. O.	n3.07	5.34	3.03	0.95	2.95	3.22	4.50	6.22	11.47	4.91	4.65	10.13	65.44	Dr. R. G. Hinsdale.
Brookhaven	C. B.; S. W. S.	4.56	5.32	1.45	.....	4.48	5.59	6.18	5.09	2.87	4.49	.....	.....	.....	Signal Service and Prof. G. T. Fitzhugh.
Canton	S. W. S.	4.46	5.91	2.74	1.98	3.65	2.67	4.92	3.68	3.19	2.29	1.05	3.12	44.66	George W. Smith, M. D.
Columbus	C. B.	.....	.....	.....	.....	3.11	4.38	5.91	2.30	2.15	2.83	.....	.....	.....	Signal Service.
Do	S. W. S.	3.12	4.40	2.94	3.57	2.89	5.20	4.07	2.79	2.27	2.34	0.90	9.90	44.39	F. M. Leigh.
Corinth	C. B.	.....	.....	.....	.....	2.08	4.03	0.40	0.06	1.08	2.07	.....	.....	.....	Signal Service.
Edwards	C. B.; S. W. S.	4.27	3.40	2.01	1.30	5.48	4.43	6.83	7.83	4.34	4.00	.....	.....	.....	Signal Service and C. W. Barber.
Greenville	S. W. S.	3.62	4.41	2.74	1.91	3.13	4.28	5.62	2.20	3.61	3.76	0.97	6.04	42.29	A. M. Green, jr.
Grenada	C. B.	.....	.....	.....	.....	2.49	2.05	1.30	0.70	3.50	2.95	.....	.....	.....	Signal Service.
Hazlehurst	C. B.	.....	.....	.....	.....	0.44	0.90	0.51	0.28	0.15	10.20	.....	.....	.....	Do.
Hermanville	S. W. S.	.....	.....	.....	1.91	T	4.74	3.29	2.83	3.97	3.34	0.98	3.39	.....	M. B. Herman.
Hernando	C. B.	.....	.....	.....	.....	3.66	3.81	2.56	0.95	0.73	1.82	.....	.....	.....	Signal Service.
Holly Springs	C. B.	.....	.....	.....	.....	2.30	1.77	3.01	1.78	0.98	2.42	.....	.....	.....	Do.
Jackson	C. B.	.....	.....	.....	.....	0.55	3.05	2.91	1.00	1.50	c2.00	.....	7.80	.....	Do.
Lake	C. B.	.....	.....	.....	.....	2.43	3.71	1.88	3.59	1.48	6.86	.....	.....	.....	Do.
Macon	C. B.	.....	.....	.....	.....	2.24	3.52	6.57	2.39	2.54	4.14	.....	.....	.....	Do.
Meridian	C. B.	.....	.....	.....	.....	2.91	2.60	5.50	4.50	2.22	3.72	.....	.....	.....	Do.
Natchez	C. B.	.....	.....	.....	.....	6.16	6.79	8.03	5.93	5.50	12.73	.....	.....	.....	Do.
Oxford	C. B.	.....	.....	.....	.....	1.58	5.74	5.06	1.33	2.97	3.03	.....	.....	.....	Do.
Okolona	C. B.	.....	.....	.....	.....	8.75	3.57	3.43	2.20	2.00	4.74	.....	.....	.....	Do.
Port Gibson	C. B.	.....	.....	.....	.....	0.27	0.36	0.39	0.04	0.55	3.00	.....	.....	.....	Do.
Starkville	S. W. S.	2.36	4.85	2.30	3.35	1.50	1.50	2.00	2.25	2.00	2.40	1.05	11.17	36.78	Agricultural and Mechanical College.
University (Oxford)	S. W. S.	4.99	3.50	4.36	2.34	1.90	5.67	4.69	1.26	3.60	3.50	1.28	6.32	43.41	Central Station.
Vicksburg	S. S.	3.62	4.13	2.77	0.75	5.40	2.99	4.11	2.44	4.55	2.99	1.43	7.07	42.25	Signal Service.
Water Valley	S. W. S.	5.22	3.00	3.77	2.89	3.27	2.30	4.45	2.25	3.36	3.77	1.09	7.43	42.71	A. Erikson.
Waynesborough	C. B.; S. W. S.	.....	3.66	1.02	1.22	3.00	2.03	6.39	1.56	1.73	2.66	.....	.....	.....	W. G. Southell and Signal Service.

Monthly and annual precipitation at Signal Service, State weather service, Military Post, Central and Southern Pacific R. R. stations, 1887—Continued.

State and stations.	Character of station.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Annual.	Authority.
Mississippi—continued:															
Yazoo	S. W. S.	2.98	4.16	2.96	3.04	4.35	1.92	3.02	1.62	3.67	3.27	0.48	6.86	38.35	H. C. Goosey.
Missouri:															
Boonville	S. W. S.	1.99	4.42	1.52	4.47	4.57	5.61	2.89	0.93	3.58	.....	0.79	3.60	.....	C. W. Hasell.
Carthage	V. O.	0.70	3.16	2.62	2.08	6.06	7.23	2.32	6.14	2.71	3.40	1.57	2.08	40.07	D. R. Goucher.
Conception	V. O.	1.85	2.79	1.40	1.50	4.00	4.69	1.27	3.87	5.18	2.25	0.67	0.73	30.20	Rev. M. Eckstein.
Fayette	V. O.	1.10	2.92	1.21	3.62	4.55	3.50	1.37	0.49	3.73	1.57	1.76	3.42	29.04	T. Berry Smith.
Glasco	S. W. S.	1.30	2.46	0.96	3.34	2.65	5.33	1.69	1.75	4.72	1.42	1.06	3.72	30.40	Prof. C. W. Pritchett.
Hermann	S. W. S.	1.66	3.30	2.42	3.39	4.61	2.06	1.69	2.85	4.48	0.28	2.42	2.14	31.30	Ed. Keler.
Houstonia	S. W. S.	1.48	3.13	1.07	3.69	4.19	10.07	1.72	1.97	.....	.....	.....	.....	.....	S. J. Spurgeon.
Ironton	S. W. S.	2.10	3.75	2.40	2.05	5.60	2.60	4.15	2.61	1.10	0.70	3.55	2.70	33.31	W. H. Delano.
Jerome	S. W. S.	1.01	3.41	1.69	3.64	4.55	3.63	3.31	2.90	3.95	1.55	4.64	3.01	37.29	C. F. Flanagan.
Kansas City	S. W. S.	0.88	2.14	1.71	1.88	2.29	6.17	1.87	6.54	5.35	2.95	1.06	2.55	35.39	J. P. Kenmuir.
Kirksville	S. W. S.	1.70	3.62	0.57	0.98	1.17	2.77	3.34	3.88	3.11	2.22	0.63	2.20	26.19	Chas. Patterson.
Lamar	S. S.	0.63	1.78	2.63	4.78	2.74	6.90	2.87	3.85	4.01	1.94	1.50	2.09	35.72	Signal Service.
Louisiana	S. W. S.	1.41	2.97	1.45	2.70	3.15	1.97	1.37	1.28	3.17	0.41	2.15	3.62	25.65	M. J. Hassler.
Mexico	S. W. S.	1.39	2.86	1.45	3.30	4.60	2.06	0.73	0.39	3.69	0.73	1.82	4.02	27.04	F. J. Llewellyn.
Miami	S. W. S.	1.57	3.29	1.38	2.78	1.95	7.88	3.92	2.44	6.48	2.50	1.46	.....	.....	A. W. Sullivan.
Mound City	S. W. S.	0.70	1.64	.....	.....	5.21	3.14	.....	.....	.....	3.40	3.25	1.67	.....	Lawrence Kaucher.
Oregon	S. W. S.	1.42	4.48	1.48	2.15	3.96	3.08	1.65	5.31	4.97	1.85	0.95	1.91	33.21	Mrs. Wm. Kaucher.
Pierce City	V. O.	.....	.....	3.65	2.70	3.30	.....	.....	.....	.....	5.10	3.80	4.10	.....	J. J. Spilman.
Pleasant Hill	S. W. S.	1.15	2.65	1.35	3.70	2.15	6.55	2.46	3.00	.....	.....	.....	.....	.....	G. C. Broadhead.
Saint Charles	S. W. S.	0.95	4.15	2.80	3.94	5.75	1.35	2.15	2.40	2.50	1.00	4.00	2.60	33.59	J. R. Mudd.
Saint Joseph	S. W. S.	0.16	0.48	.....	.....	2.26	4.40	.....	.....	3.13	1.47	1.13	0.70	.....	Robt. Gunn.
Saint Louis	S. S.	0.65	3.62	3.54	4.36	5.27	2.54	2.74	1.14	2.47	0.76	4.61	3.54	35.30	Signal Service.
Saint Louis, (Central Station)	S. W. S.	0.70	3.78	3.87	5.50	5.46	2.29	2.70	1.01	2.60	0.60	4.79	3.24	36.54	Maurice Johnson.
Saint Louis Water-Works	S. W. S.	1.93	3.30	3.26	4.02	4.92	1.90	1.70	1.18	2.10	0.70	3.62	1.90	30.48	A. W. Grote.
Savannah	S. W. S.	0.85	3.25	1.50	.....	.....	.....	.....	.....	5.25	2.80	.....	1.60	.....	R. Van Buskirk.
Sedalia	S. W. S.	2.01	1.94	1.84	4.12	3.98	7.83	3.16	0.69	6.05	1.45	1.80	3.10	37.97	C. G. Taylor.
Shelbina	S. W. S.	2.20	2.57	1.00	2.20	3.70	1.43	4.20	1.51	5.40	1.50	1.30	3.30	30.31	Jno. S. Chandler.
Springfield	S. W. S.	2.08	1.75	1.20	2.04	5.08	6.32	2.63	3.29	2.45	2.35	4.09	2.73	36.01	E. F. Copp.
Do	V. O.	2.60	4.10	2.50	2.80	4.60	6.65	.....	.....	.....	.....	3.27	2.39	.....	E. M. Shepard, T. S. Collins.
Steelville	S. W. S.	1.40	3.30	2.07	3.88	4.83	1.25	3.10	2.70	2.55	2.15	3.50	2.49	33.24	E. A. Pinnell.
Troy	S. W. S.	.....	.....	2.70	6.20	3.80	2.30	3.80	1.50	2.75	0.50	1.20	2.00	.....	I. A. Ward.
Montana:															
Assinaboine, Fort	S. S.	1.17	0.05	0.07	1.64	0.72	0.33	1.16	2.56	1.14	0.18	0.29	0.63	18.94	Signal Service.
Custer, Fort	S. S.	1.31	0.32	1.19	2.16	1.15	0.97	0.67	1.48	1.12	1.31	0.65	0.44	12.18	Do.
Helena	S. S.	1.35	0.61	0.12	1.92	2.41	3.48	0.27	1.88	0.50	1.01	0.22	0.29	14.05	Do.
Keogh, Fort	M. P.	1.20	0.26	0.16	1.08	1.22	1.82	0.44	2.30	1.74	1.14	0.16	0.31	11.83	U. S. Post Hospital.
Maginnis, Fort	S. S.	2.77	0.94	1.19	2.16	0.51	2.39	2.41	4.54	5.15	1.99	1.39	0.42	26.00	Signal Service.
Missoula, Fort	M. P.	1.26	0.98	0.24	1.95	0.46	3.98	0.69	1.14	0.36	1.96	0.58	0.38	13.38	U. S. Post Hospital.

Poplar River	S. S.	0.49	0.58	0.14	0.31	1.04	4.19	2.10	3.72	0.90	1.37	0.29	0.23	15.51	Signal Service.
Nebraska:															
Brownsville	V. O.	0.90	1.01	1.00	1.40	4.93	3.93	2.30	3.74	5.36	0.75	2.07	0.08	27.47	G. D. Carrington.
Crete	V. O.	0.63	0.93	0.09	1.02	5.68	4.03	1.75	3.75	2.90	0.77	1.42	0.87	23.24	Prof. Goodwin D. Swezey.
De Soto	V. O.	0.33	0.81	0.58	1.01	1.39	4.94	1.17	3.36	2.80	1.33	1.01	1.27	20.00	Charles Seltz.
Fairbury	V. O.	0.30	0.55	0.60	1.70	3.90	2.14	2.74	3.28	1.35	0.57	0.50	0.43	18.03	Dr. I. Humphrey.
Fremont	V. O.	0.79	1.14	0.40	1.38	2.87	2.60	3.83	3.57	1.69	1.62	0.52	1.55	22.26	Isaac Heaton.
Genoa	V. O.	1.08	0.62	0.37	2.26	1.78	5.79	4.38	4.48	11.34	0.62	0.52	0.59	32.78	George S. Truman.
Hay Springs	V. O.	0.31	0.41	1.22	2.30	5.87	3.60	1.48	3.14	0.78	1.45	0.23	1.61	22.90	William Waterman.
Lincoln	V. O.	0.15	1.22	0.52	0.53	3.79	2.36	.....	.....	.....	0.85	1.18	0.70	.....	University of Nebraska.
Marquette	V. O.	0.15	0.85	0.02	2.15	1.61	7.22	1.59	2.63	2.57	0.50	0.41	0.95	20.85	John Ellis.
Niobrara, Fort	M. P.	1.00	1.60	0.22	4.06	1.83	2.14	1.66	2.46	1.16	0.56	0.32	0.20	17.22	U. S. post hospital.
North Platte	S. S.	0.15	0.49	0.22	3.41	0.81	3.20	3.05	4.61	5.10	0.15	0.19	0.30	21.68	Signal Service.
Omaha	S. S.	0.49	1.00	0.48	0.88	1.39	4.56	2.02	3.94	2.44	0.72	0.89	1.11	19.92	Do.
Robinson, Fort	M. P.	1.11	0.56	0.63	2.60	3.72	0.72	1.90	3.32	0.10	3.60	0.26	0.02	23.58	U. S. post hospital.
Sidney, Fort	M. P.	0.12	2.00	0.88	0.41	1.05	1.21	1.53	3.74	4.04	.....	0.15	0.16	.....	Do.
Tecumseh	V. O.	0.75	2.40	0.90	2.15	5.79	3.99	0.80	4.25	4.87	0.70	0.05	0.33	27.48	W. L. Dunlap.
Valentine	S. S.	0.29	0.41	0.23	2.52	2.60	3.89	2.53	2.94	1.36	0.57	0.13	0.53	18.00	Signal Service.
Nevada:															
Battle Mountain	R. R.	0.73	1.15	0.30	1.24	0.14	0.50	0.12	0.18	.....	0.00	0.10	0.50	.....	Pacific Railroad system.
Beowawe	R. R.	0.20	1.20	0.00	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.50	0.20	2.17	Do.
Brown's	R. R.	....	1.29	0.25	0.50	1.10	0.20	0.00	0.15	0.25	0.00	0.00	.....	.....	Do.
Carlin	R. R.	0.61	2.00	0.14	1.62	0.08	0.13	0.35	0.01	0.10	0.00	0.20	0.70	5.94	Do.
Carson City	V. O.	1.10	3.27	0.23	0.65	0.46	0.46	0.23	0.00	0.11	0.04	T	2.08	8.63	C. W. Friend.
Elko	R. R.	0.02	1.60	0.00	0.70	0.00	0.23	0.40	0.10	0.15	0.00	0.20	0.98	4.38	Pacific Railroad system.
Golconda	R. R.	0.09	1.15	T	0.94	0.07	0.85	0.00	0.00	0.00	0.00	0.10	0.30	3.50	Do.
Halleck	R. R.	0.29	1.85	0.00	0.18	0.12	0.00	0.25	0.10	0.40	0.00	0.60	0.90	4.69	Do.
Hawthorne	R. R.	0.00	1.85	0.00	0.08	.....	1.13	0.25	0.00	0.30	0.00	0.10	0.42	.....	Do.
Hot Springs	R. R.	0.12	1.80	0.00	0.00	0.00	0.12	T	0.00	0.00	0.00	0.00	0.15	2.19	Do.
Humboldt	R. R.	0.00	1.25	0.00	0.00	0.00	1.30	0.00	0.20	0.00	0.00	0.00	0.50	3.25	Do.
McDermit, Fort	M. P.	0.52	7.35	.....	3.06	1.23	2.32	0.40	0.18	0.22	.....	0.68	10.54	.....	U. S. post hospital.
Otego	R. R.	1.07	1.70	0.35	1.36	*0.02	.....	1.10	*d*0.00	.....	.....	.....	.....	.....	Pacific Railroad system.
Palisade	R. R.	0.45	2.12	0.00	.....	.....	0.10	0.00	0.00	0.50	0.00	0.10	0.90	.....	Do.
Reno	R. R.	0.60	2.90	0.00	0.17	0.40	0.10	0.00	0.00	0.00	0.00	0.00	1.60	5 77	Do.
Tecoma	R. R.	1.00	0.88	0.40	0.40	0.00	0.10	0.65	0.15	0.40	0.00	0.02	0.50	4.50	Do.
Toano	R. R.	1.18	1.55	0.10	1.18	0.15	0.30	0.86	0.00	0.00	0.04	0.45	0.82	6.58	Do.
Wadsworth	R. R.	0.28	2.52	0.00	0.18	0.60	0.52	1.28	0.10	0.15	0.00	0.00	0.98	6.70	Do.
Wells	R. R.	0.80	1.35	0.00	0.00	0.05	0.00	0.00	0.00	0.20	0.00	0.30	0.70	3.40	Do.
Winnemucca	S. S.	0.51	1.55	0.40	1.94	0.36	1.14	0.00	0.18	0.35	T	0.03	1.55	8.05	Signal Service.
Do	R. R.	0.62	1.71	0.40	1.62	0.44	1.06	0.09	0.13	0.32	0.00	0.00	1.55	7.94	Pacific Railroad system.
New Hampshire:															
Antrim	V. O.	5.82	5.77	3.78	2.82	2.29	6.32	6.10	8.83	1.11	3.08	3.88	4.01	53.81	F. W. Palmer.
Ashland	V. O.	4.23	5.43	2.74	3.48	2.39	6.09	4.80	4.13	1.29	1.72	4.17	5.31	45.78	Lake Winipiseogee Manufacturing Company.
Belmont	V. O.	4.19	5.88	3.30	2.67	2.33	5.01	5.63	6.52	1.08	1.40	3.41	4.20	45.62	Lake Winipiseogee Manufacturing Company.
Berlin Mills	V. O.	3.66	5.30	2.38	2.22	2.37	4.33	7.28	2.32	1.18	1.80	3.52	4.74	41.19	Q. A. Bridges.
Bristol	V. O.	3.66	4.89	2.84	3.06	2.84	6.78	6.08	3.38	1.21	1.80	3.99	5.09	47.62	Lake Winipiseogee Manufacturing Company.
Concord	V. O.	3.35	4.86	3.04	2.94	2.33	4.56	7.84	7.68	0.82	1.71	3.70	3.62	46.45	W. L. Foster.
Grafton	N. E. M. S.	4.40	4.55	3.40	.....	3.82	5.67	7.18	5.60	1.58	.....	3.74	3.74	.....	P. R. Kimball.
Hanover	N. E. M. S.	4.82	7.67	2.43	1.54	3.55	2.74	.....	3.14	0.91	1.89	2.98	3.45	.....	C. S. Cook, C. F. Chase.

Monthly and annual precipitation at Signal Service, State weather service, Military Post, Central and Southern Pacific R. R. stations, 1887—Continued.

State and stations.	Character of station.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Annual.	Authority.
New Hampshire—Continued.															
Lake Village	V. O.	3.36	5.25	3.57	2.49	2.02	5.87	6.83	4.28	2.02	1.53	3.48	4.53	45.43	Lake Winipiseogee Manufacturing Company.
Manchester	N. E. M. S.	5.61	4.76	3.99	3.33	3.07	4.16	9.34	6.60	1.04	2.38	3.42	4.21	51.91	S. D. Lord.
Do	N. E. M. S.	5.48	5.20	4.07	3.10	3.17	4.49	9.54	6.73	1.21	2.74	3.67	3.47	52.87	W. Little.
Do	S. S.	.....	.....	3.68	2.54	2.20	3.37	7.14	6.33	0.94	1.98	3.02	3.30	.....	Signal Service.
Mount Washington	S. S.	4.27	1.59	2.88	5.17	4.23	9.78	15.16	5.51	4.03	.....	.....	.....	.....	Do.
Nashua	V. O.	5.43	4.83	4.43	3.37	1.87	3.84	7.95	5.50	1.18	2.36	3.31	4.07	47.64	Charles H. Webster.
Do	N. E. M. S.	5.03	4.64	4.04	2.71	1.93	3.29	7.88	.....	.....	.....	.....	.....	.....	Nashua Manufacturing Company.
Quincy	N. E. M. S.	4.95	5.61	3.37	3.08	3.62	5.55	5.35	4.29	1.34	.....	.....	.....	.....	Miss M. H. Dix.
Shelburn	N. E. M. S.	2.18	4.80	2.42	4.30	2.33	3.99	5.80	3.11	1.52	2.24	4.01	3.65	40.35	W. F. Carr.
Stratford	N. E. M. S.	3.22	3.04	1.46	3.10	2.00	4.82	7.10	2.23	2.12	2.87	2.09	4.33	38.48	N. B. Waters.
Walpole	N. E. M. S.	4.95	5.16	2.86	3.02	2.95	4.52	6.05	6.95	1.12	3.95	4.51	4.99	51.03	E. A. Knowlton.
West Milan	N. E. M. S.	5.09	4.36	1.92	3.14	1.60	5.10	6.92	3.00	1.29	1.64	3.03	4.51	41.60	A. A. Higgins.
Wier's Bridge	V. O.	3.58	5.35	3.18	2.50	1.90	5.90	5.48	3.69	1.28	1.27	3.64	4.67	42.53	Lake Winipiseogee Manufacturing Company.
Wolfborough	V. O.	5.19	5.63	4.69	4.45	1.92	4.78	6.90	4.40	2.18	2.10	4.22	5.47	51.93	Do.
Woodstock	V. O.	6.90	7.35	2.52	3.45	6.20	6.73	6.70	4.83	1.70	2.80	3.31	4.71	57.20	Do.
New Jersey:															
Atlantic City	S. S.	3.50	4.17	2.94	2.85	1.61	4.21	1.95	3.08	3.12	3.39	2.58	4.51	37.91	Signal Service.
Beverly	V. O.	2.30	4.99	3.25	2.60	1.50	5.64	9.48	2.86	5.27	2.42	1.66	5.01	46.98	Prof. C. F. Richardson.
Bordentown	V. O.	4.03	5.28	3.34	2.96	1.87	7.83	7.90	2.09	3.56	2.42	2.44	5.66	49.38	Dr. M. S. Simpson.
Bridgetown	S. W. S.	2.75	3.67	2.76	3.93	2.57	6.95	4.88	4.20	3.66	3.06	1.44	5.05	44.92	H. A. Jordan.
Clayton	V. O.	2.67	4.95	3.37	2.72	1.55	7.62	4.57	3.15	5.40	2.22	2.02	4.62	44.87	William T. Wilson.
Dover	V. O.	6.21	4.81	2.45	2.20	2.93	7.06	10.02	3.20	1.94	1.99	1.58	6.78	51.17	W. C. Harris.
Egg Harbor City	V. O.	2.28	4.73	3.33	3.77	1.04	5.54	4.59	2.60	5.70	3.78	2.60	5.04	45.00	H. Y. Postma.
Elizabeth	V. O.	1.25	4.48	3.56	2.89	0.53	6.60	7.71	2.79	2.87	2.79	2.11	2.81	40.39	Dr. N. L. Wilson.
Gillette	S. W. S.	.....	.....	.....	.....	.....	0.94	9.31	2.98	1.62	.....	0.95	5.68	.....	R. N. Cornish.
Harrisville	S. W. S.	.....	4.60	3.68	3.20	1.15	6.79	3.78	5.19	5.10	2.70	2.30	.....	.....	John W. Harris.
Hopewell	S. W. S.	.....	.....	.....	2.30	1.50	7.82	6.05	2.81	2.30	2.30	1.45	.....	.....	J. M. Dalrymple.
Imlaystown	S. W. S.	3.28	6.45	3.22	2.90	1.17	8.19	6.81	2.12	4.92	2.68	1.74	6.00	49.48	H. G. Norton, M. D.
Lakewood	S. W. S.	.....	4.57	3.66	3.57	1.44	.....	.....	.....	.....	3.23	2.14	.....	.....	W. C. Stone, M. D.
Lambertville	S. W. S.	.....	.....	3.68	2.71	1.18	10.29	7.92	2.87	3.24	2.04	1.68	7.32	.....	George H. Larison, M. D.
Locktown	S. W. S.	3.52	6.16	3.06	2.06	1.99	7.78	7.86	5.37	3.04	2.22	1.32	6.01	50.72	G. A. Hockenbury.
Matawan	S. W. S.	2.00	4.65	2.77	2.12	0.08	6.47	14.00	3.34	3.18	2.43	1.55	4.28	46.84	Prof. J. Calvin Rice.
Moorestown	V. O.	2.92	5.32	2.85	2.42	1.88	6.20	6.59	3.17	6.09	1.93	1.66	4.92	45.97	Thomas J. Beans.
Newark	S. W. S.	3.63	5.43	3.62	3.12	0.58	7.00	7.05	3.23	2.30	2.58	2.08	4.43	45.00	F. W. Ricord.
New Brunswick	S. W. S.	4.74	6.15	3.59	3.31	1.14	6.28	6.10	7.34	3.07	2.44	2.30	5.28	51.84	P. V. Spader.
Do	S. W. S.	4.44	5.65	3.23	3.04	1.11	5.98	5.35	6.24	3.06	2.37	2.21	5.32	48.20	Central Station.
Do	S. W. S.	4.96	6.74	3.62	3.48	1.40	6.12	5.62	e5.58	3.37	2.45	2.22	5.30	50.92	Prof. Austin Scott.
Ocean City	S. W. S.	.....	5.25	.....	3.60	1.50	.....	.....	2.10	3.80	5.00	2.00	5.50	.....	William Lake.
Oceanic	S. W. S.	.....	1.13	4.64	3.35	0.35	7.67	6.95	5.15	3.75	3.90	2.54	5.43	.....	Rev. S. W. Knipe.

Paterson	S. W. S.	4.93	5.98	2.95	1.50	2.97	7.47	9.83	.....	2.00	2.00	1.55	5.95	.....	Prof. A. B. Wiggin.
Princeton	S. W. S.	3.84	5.42	3.00	2.50	1.71	.....	.....	.....	1.27	1.58	1.86	4.79	.....	Malcolm McNeil.
Rancocas	S. W. S.	2.90	5.59	2.75	2.51	2.50	6.01	9.99	2.75	6.20	1.90	1.51	5.01	49.62	Spencer Haines.
Roseland	V. O.	4.84	6.11	2.85	2.83	1.69	7.60	9.17	3.97	2.35	3.10	.....	.....	.....	W. E. Cass.
Somerville	S. W. S.	5.93	5.42	4.41	2.67	1.45	5.75	9.83	4.01	3.39	2.35	2.39	5.89	53.31	A. C. Lindsley.
South Orange	V. O.	3.50	5.07	2.45	2.28	0.93	5.50	9.38	6.33	1.89	1.90	1.60	5.55	46.34	Dr. W. J. Chandler.
Tenafly	S. W. S.	2.61	3.11	3.86	0.91	0.31	9.57	4.86	5.50	2.22	2.87	2.06	3.64	41.52	Arthur D. Atwood.
Union	S. W. S.	6.35	5.03	3.27	2.47	0.97	6.87	9.29	2.69	2.56	2.47	1.92	3.64	47.44	F. L. Dunbar.
Vineland	V. O.	3.12	3.94	2.56	4.07	2.36	6.25	8.71	2.81	5.20	2.44	2.03	4.31	47.80	O. H. Adams, M. D.
New Mexico:															
Bayard, Fort	M. P.	0.08	1.51	0.00	0.01	0.75	0.22	1.57	3.64	4.30	0.82	0.00	0.27	13.17	U. S. Post Hospital.
Deming	R. R.	0.00	0.20	0.00	0.00	0.00	0.00	2.02	3.46	3.39	2.13	0.31	0.05	11.56	Pacific railroad system.
Gallinas Springs	V. O.	0.75	0.05	0.15	0.80	3.60	5.57	0.42	1.66	3.62	1.45	0.45	0.13	18.65	James E. Whitmore.
Lava	S. S.	T	0.46	T	0.06	0.40	0.64	1.27	1.94	2.12	8.50	0.03	0.11	15.53	Signal Service.
Lordsburg	R. R.	0.00	0.12	0.00	0.00	0.10	0.30	3.17	2.67	1.31	0.00	0.32	0.70	8.69	Pacific railroad system.
Santa Fé	S. S.	0.10	0.85	0.16	0.74	1.73	0.60	2.24	1.57	2.41	1.50	0.66	0.32	13.38	Signal Service.
Selden, Fort	M. P.	0.10	0.30	0.00	0.00	0.58	0.20	0.68	2.64	1.94	0.74	0.00	0.24	7.42	U. S. post hospital.
Stanton, Fort	S. S.	0.01	0.11	0.25	0.04	0.72	2.50	2.59	3.49	4.21	1.75	0.17	0.93	16.77	Signal Service.
Union, Fort	M. P.	0.45	.....	.....	1.91	2.72	4.23	2.83	1.82	0.90	1.70	0.40	3.75	.....	U. S. post hospital.
Wingate, Fort	M. P.	0.52	1.72	0.50	0.90	0.22	1.24	2.94	1.60	3.26	1.10	1.04	1.10	16.14	Do.
New York:															
Albany	S. S.	3.02	2.86	2.90	2.49	2.27	2.99	4.61	4.61	1.94	2.22	4.36	5.43	39.70	Signal Service.
Auburn	V. O.	3.05	4.49	3.64	1.66	1.56	3.05	6.97	3.73	0.93	1.75	2.13	3.40	36.36	George Casey.
Brooklyn	V. O.	4.81	5.15	3.69	3.12	0.74	5.38	7.47	.....	.....	.....	.....	.....	.....	S. A. Dunn.
Do	V. O.	2.46	4.42	3.69	.....	0.95	7.49	.....	.....	.....	0.53	1.69	3.84	.....	Prof. W. C. Peckham.
Buffalo	S. S.	1.92	5.51	2.12	1.47	3.08	2.05	1.96	3.56	2.30	2.76	2.53	2.27	31.55	Signal Service.
Carmel (Boyd's Corners)	V. O.	5.68	5.95	3.60	3.47	0.32	7.70	13.55	6.85	1.90	3.12	2.69	6.71	61.54	Thomas Manning.
Columbus, Fort	M. P.	4.53	5.99	3.85	.....	0.68	7.62	8.36	3.85	2.17	2.51	1.96	4.29	.....	U. S. post hospital.
Cooperstown	V. O.	3.23	5.21	4.32	2.42	2.83	2.56	2.85	3.34	1.42	1.19	3.15	3.43	35.95	G. P. Keese.
Factoryville	V. O.	1.20	2.88	1.54	1.45	1.33	2.79	7.19	2.63	2.57	2.11	2.17	2.00	29.86	T. P. Yates.
Humphrey	V. O.	4.06	7.30	2.29	3.10	1.50	2.14	2.53	3.37	3.09	3.96	2.29	2.60	38.23	Charles E. Whitney.
Ithaca	V. O.	1.55	4.21	1.87	1.52	3.07	3.47	3.97	3.04	1.95	1.45	2.01	2.48	30.59	Engineering department, Cornell University.
Lebanon Springs	V. O.	4.61	3.80	3.70	3.01	1.63	4.09	9.45	7.29	3.45	.....	.....	.....	.....	W. H. Harrison.
Le Roy	V. O.	2.52	3.42	1.74	2.25	2.10	2.69	.....	2.83	1.62	1.71	2.03	1.90	.....	Prof. F. M. Comstock.
Madison Barracks	M. P.	2.86	1.50	1.34	1.96	1.58	2.08	0.53	1.49	1.12	5.88	1.46	1.62	22.90	U. S. Post Hospital.
Menands	V. O.	2.97	3.40	3.38	2.89	1.92	3.18	4.83	5.10	1.57	2.69	3.90	3.76	39.59	C. B. Tillinghast.
New York City	S. S.	4.19	5.26	3.51	3.67	0.99	7.70	6.75	3.66	2.30	2.36	2.04	4.20	46.63	Signal Service.
Do	V. O.	4.42	5.96	3.07	2.79	0.34	7.76	5.29	3.59	1.93	2.43	2.02	4.39	43.99	Central Park Observatory.
Niagara, Fort	M. P.	0.64	4.12	1.42	0.21	0.96	1.72	0.83	0.69	0.38	1.12	0.54	.....	.....	U. S. post hospital.
Oswego	S. S.	0.92	3.48	1.21	1.58	1.03	2.72	1.82	1.69	1.91	2.39	2.38	2.28	23.41	Signal Service.
Palermo	V. O.	5.39	2.03	1.08	1.12	1.85	2.27	2.65	1.91	2.33	1.93	3.25	2.45	28.26	E. B. Bartlett.
Penn Yan	V. O.	0.97	3.61	1.52	1.56	1.34	2.80	4.00	3.76	1.99	1.46	0.97	2.38	26.36	George R. Young.
Plattsburgh Barracks	M. P.	1.56	1.66	1.78	1.37	0.40	2.26	2.08	2.20	0.51	1.24	3.14	1.76	19.91	U. S. post hospital.
Rochester	S. S.	1.34	4.75	0.94	2.51	1.17	1.51	1.90	1.59	0.90	1.31	0.80	1.58	20.30	Signal Service.
Setauket	V. O.	5.33	6.00	4.96	3.95	0.10	6.57	5.30	4.62	2.45	3.76	2.62	3.42	49.08	S. B. Strong.
West Point	M. P.	4.40	5.60	3.10	3.30	1.50	6.30	7.44	2.20	1.90	3.30	2.86	5.38	47.28	U. S. post hospital.
White Plains	V. O.	4.38	4.06	9.91	4.48	0.15	7.99	6.91	2.87	2.15	1.70	3.16	6.40	54.16	Prof. O. R. Willis.
North Carolina:															
Chapel Hill	V. O.	2.81	4.62	3.93	2.56	6.59	.....	6.59	.....	1.39	11.21	0.85	6.19	.....	Prof. J. W. Gore.
Charlotte	S. S.	2.39	4.81	2.93	1.84	3.64	4.44	7.46	9.02	1.24	8.04	0.51	4.94	51.26	Signal Service.

Monthly and annual precipitation at Signal Service, State weather service, Military Post, Central and Southern Pacific R. R. stations, 1887—Continued.

State and stations.	Character of station.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Annual.	Authority.
North Carolina—Continued.															
Goldsborough	C. B.	.....	.....	.....	.....	7.83	5.73	6.42	14.36	2.25	5.45	.....	.....	.....	Signal Service.
Hatteras	S. S.	6.09	1.37	3.04	2.71	2.58	3.41	6.18	7.99	0.80	11.07	2.87	6.96	55.07	Do.
Kitty Hawk	S. S.	2.55	4.08	4.60	2.39	2.82	4.31	c2.88	h12.04	d0.09	i4.37	h1.63	f4.13	45.20	Do.
Lenoir	V. O.	4.60	4.70	2.30	3.80	4.00	5.00	5.70	7.50	3.40	4.10	0.70	3.80	49.60	Dr. R. L. Beall.
Lincolnton	V. O.	2.35	5.86	3.10	2.16	3.48	1.72	5.32	11.12	2.66	3.91	0.12	3.97	45.77	Dr. L. R. Standenmayer.
Lumberton	C. B.	.....	.....	.....	.....	2.75	1.98	2.97	9.11	1.12	9.51	.....	.....	.....	Signal Service.
Mount Holly	S. W. S.	1.98	2.95	1.98	2.08	4.60	5.15	6.73	1.82	.....	6.60	1.08	5.17	.....	
New Berne	C. B.	.....	.....	.....	.....	4.40	2.78	6.01	11.88	0.40	4.98	.....	.....	.....	Signal Service.
Raleigh	S. S.	3.04	4.97	4.13	2.10	3.46	6.22	6.11	10.80	2.17	10.23	1.00	4.99	59.22	Do.
Do	V. O.	2.65	3.75	3.00	1.70	3.15	6.10	9.10	8.85	1.80	9.80	0.45	4.70	55.05	T. C. Harris.
Reidsville	S. W. S.	0.94	.....	2.26	3.18	3.31	2.66	4.76	10.36	2.95	.....	.....	.....	.....	T. J. Norcom.
Salisbury	C. B.	.....	.....	.....	.....	7.21	3.80	6.26	16.14	2.43	14.19	.....	.....	.....	Signal Service.
Southport	S. S.	3.00	1.83	0.82	2.27	4.93	9.74	7.61	12.53	1.28	4.08	3.68	7.78	59.55	Do.
Statesville (near)	V. O.	2.36	4.60	3.16	2.72	3.38	3.17	6.54	12.25	3.65	6.51	0.90	4.50	53.74	W. A. Eliason.
Tarborough	V. O.	3.59	3.56	3.89	2.95	5.55	3.08	11.63	22.73	2.02	6.12	1.94	3.82	70.88	E. V. Zoeller.
Wadesborough	C. B.	.....	.....	.....	.....	3.16	2.50	7.40	5.36	1.55	6.64	.....	.....	.....	Signal Service.
Wake Forest	V. O.	3.01	4.37	4.45	1.85	2.58	.....	3.34	.....	.....	.....	.....	.....	.....	Wake Forest College.
Wash Woods	S. S.	4.52	3.98	4.28	2.96	3.26	4.11	a1.55	11.87	0.54	3.23	.....	e3.04	.....	Signal Service.
Weldon	C. B.	.....	.....	.....	.....	7.57	4.69	5.50	5.44	3.07	8.45	.....	.....	.....	Do.
Do	V. O.	3.47	3.07	4.30	1.92	8.07	5.06	6.27	5.88	3.49	9.97	1.37	4.20	57.07	T. A. Clark.
Wilmington	S. S.	3.30	1.61	1.48	3.96	5.62	6.41	6.77	9.88	0.46	6.53	1.04	4.41	51.47	Signal Service.
Ohio:															
Akron	S. W. S.	.....	.....	.....	.....	1.62	4.12	3.14	4.01	1.47	0.94	2.34	2.00	.....	Prof. C. S. Howe.
Bangorville	S. W. S.	2.04	6.70	2.87	3.12	3.99	4.52	2.13	2.44	1.51	0.63	2.82	2.04	34.81	S. M. Painter.
Canton	S. W. S.	1.59	6.95	1.76	3.21	3.24	3.32	4.86	2.33	2.42	0.71	2.01	1.77	34.08	C. F. Stokey.
Cincinnati	S. S.	2.37	7.29	2.07	5.86	3.62	2.64	1.81	2.81	1.93	0.55	2.83	1.80	35.08	Signal Service.
Clarksville	S. W. S.	1.63	7.41	2.90	6.23	2.08	2.41	1.73	3.04	1.63	0.64	4.33	2.47	36.50	R. T. M. Williams.
Cleveland	S. S.	1.92	7.73	3.05	1.82	3.45	2.43	0.99	3.52	3.62	1.80	2.97	2.06	35.36	Signal Service.
Do	V. O.	2.24	7.54	2.89	2.31	3.85	2.99	1.71	3.51	3.78	2.25	3.18	1.77	38.02	G. A. Hyde.
College Hill	V. O.	3.00	10.25	2.80	6.00	6.25	3.75	1.50	3.75	1.75	0.18	4.00	3.50	46.68	John W. Hammitt.
Do	S. W. S.	2.47	7.16	2.35	6.17	3.66	1.94	1.27	2.60	2.94	0.39	3.64	2.14	36.73	Prof. A. D. Morrill.
Columbus	S. S.	2.35	6.48	2.56	3.44	2.97	2.82	1.45	2.21	1.35	0.30	2.45	1.87	30.25	Signal Service.
Dayton	S. W. S.	2.05	5.30	3.39	4.15	2.54	4.23	3.27	2.08	1.37	0.52	3.59	2.51	34.94	Mrs. Edith E. L. Boyer.
Ellsworth	S. W. S.	1.24	6.32	..	2.52	2.80	2.88	1.89	2.94	1.75	0.95	2.25	2.10	.....	D. A. Allen.
Elyria	V. O.	2.88	8.46	3.05	2.88	2.81	3.73	0.79	2.17	3.07	1.23	3.16	1.96	35.69	Charles W. Goodspeed.
Garrettsville	V. O.	1.73	7.39	2.46	3.39	3.47	5.66	1.27	2.27	4.70	1.31	2.41	2.65	38.71	S. M. Luther.
Georgetown	S. W. S.	2.50	9.96	1.63	3.28	3.39	3.96	1.60	2.66	3.11	1.01	3.41	2.84	44.35	Dr. Thomas W. Gordon.
Greenville	S. W. S.	2.84	5.31	1.95	3.25	3.41	3.72	0.92	4.65	1.78	0.89	2.96	2.78	34.46	Charles L. Katzenberger.
Hanging Rock	S. W. S.	3.11	10.38	1.59	5.98	2.65	3.37	3.54	2.52	2.41	0.92	2.02	2.29	40.73	James Bull.
Hiram	V. O.	1.83	9.56	2.86	3.96	3.50	6.64	.....	2.83	3.74	1.86	2.60	2.06	.....	Prof. George H. Colton

Hudson	S. W. S.	2.26	6.66	2.73	2.88	3.37	6.67	1.12	1.18	2.04	1.40	2.61	2.16	35.03	D. W. Myers.
Jacksonborough	V. O.	1.85	6.25	3.59	5.15	2.25	3.25	0.70	1.75	1.45	0.40	4.05	3.35	33.85	Dr. J. B. Owsley.
Jefferson	S. W. S.	.....	6.22	3.66	2.61	2.99	2.49	1.68	2.36	2.81	3.55	3.15	1.87	.....	E. C. Wade, Mrs. W. P. Howland.
Lima	S. W. S.	4.00	6.60	2.40	3.10	6.20	4.60	2.10	3.20	1.30	1.50	.....	.....	.....	
Logan	S. W. S.	1.38	7.62	1.87	6.70	2.60	6.15	3.90	2.59	1.82	0.78	3.28	1.66	40.35	Dr. James Little.
Lordstown	S. W. S.	1.09	5.51	2.15	3.22	2.42	.....	.....	.....	2.46	.....	.....	.....	.....	W. S. Dean.
McConnellsville	S. W. S.	1.74	6.94	1.76	5.86	3.40	4.35	3.62	0.55	1.65	0.52	2.74	2.15	35.28	C. H. Morris.
Marietta	S. W. S.	2.54	7.57	1.38	5.65	3.07	5.81	1.12	2.56	2.30	0.55	2.19	2.48	37.22	Prof. T. D. Biscoe.
Do	S. S.	2.45	7.01	1.34	5.09	5.74	5.72	1.98	.....	.....	0.67	1.90	1.92	.....	
Napoleon	V. O.	1.85	5.38	1.21	1.94	2.73	3.20	1.25	1.59	1.12	2.22	3.14	3.36	28.99	Dr. T. C. Hunter.
New Alexandria	S. W. S.	2.67	5.27	1.33	2.60	2.11	5.55	2.39	2.40	1.98	0.87	2.49	2.38	31.95	Joseph A. Hook.
New Bremen	S. W. S.	1.80	7.05	.....	2.34	.....	.....	2.55	2.74	1.59	0.92	4.82	4.83	.....	C. W. Williamson.
New Comerstown	S. W. S.	2.31	6.80	1.37	4.44	4.84	6.25	4.11	2.28	2.75	0.95	2.43	1.31	39.84	Dr. A. M. Beers.
North Lewisburg	V. O.	3.05	5.60	2.20	3.70	4.35	2.70	2.20	3.00	2.05	0.45	3.25	2.50	35.05	H. D. Gowey.
Oberlin	S. W. S.	2.00	3.05	1.55	1.13	3.74	5.59	0.61	2.24	2.20	0.63	1.79	1.11	25.64	Oberlin College.
Paulding	S. W. S.	2.42	6.23	1.51	1.68	3.61	5.59	0.13	1.61	2.26	1.59	3.64	2.63	32.20	Mrs. L. E. Hitchcock.
Pomeroy	S. W. S.	.....	9.34	2.37	3.27	2.08	3.00	4.18	0.97	1.98	0.82	1.69	3.27	.....	Dr. D. N. Allard.
Portsmouth	V. O.	2.84	9.28	1.94	6.01	1.76	3.46	4.12	1.75	2.09	0.72	2.47	4.64	41.08	Dr. D. B. Cotton.
Quaker City	S. W. S.	2.26	6.46	1.46	3.53	5.70	3.47	4.61	1.64	2.63	0.99	3.06	2.60	38.41	Joel Hall.
Ruggles	V. O.	1.90	5.30	3.25	3.75	2.55	3.30	0.70	2.20	2.35	0.55	2.50	3.10	31.45	Peter Bowman.
Sandusky	S. S.	1.51	8.53	2.16	2.10	1.61	4.44	0.59	1.57	2.31	0.88	2.25	1.90	29.85	Signal Service.
Sidney	S. W. S.	1.89	5.95	0.54	3.90	3.35	2.80	4.20	2.35	2.85	0.60	4.10	3.00	35.53	Ed. Pence, Lewis Huddle.
Springfield	S. W. S.	1.28	4.86	3.00	3.90	2.16	.....	1.62	.....	.....	.....	.....	.....	.....	Jonas Drury.
State University	S. W. S.	1.54	5.85	2.84	4.45	4.36	5.47	1.56	2.47	1.82	0.38	2.84	2.04	35.62	Moses Craig.
Tiffin	V. O.	1.75	6.60	2.23	2.51	2.52	3.67	1.46	1.66	1.81	0.94	3.22	2.53	31.20	Prof. T. H. Sonnedecker.
Do	V. O.	1.67	6.68	2.26	1.99	2.21	3.06	1.27	1.86	1.56	.....	.....	.....	.....	R. J. Thompson.
Toledo	S. S.	2.21	6.84	1.12	1.57	1.46	3.26	3.13	1.81	3.37	1.82	2.64	2.78	32.01	Signal Service.
Upper Sandusky	S. W. S.	2.08	6.54	2.52	2.18	2.84	4.57	1.69	2.19	2.07	1.07	2.69	3.85	34.29	Dr. A. Billhardt.
Washington C. H	S. W. S.	1.85	5.80	2.19	5.96	2.27	1.69	.....	3.15	1.44	0.61	3.28	3.66	.....	R. H. Morrow, Emmer Edwards.
Wauseon	V. O.	2.36	7.19	1.49	1.52	3.50	3.55	2.87	1.52	1.70	1.97	3.78	2.69	34.14	Thomas Mikesell.
Waverly	S. W. S.	2.14	9.62	1.60	6.87	1.28	2.70	3.57	1.46	1.94	0.36	2.91	3.25	37.70	H. W. Overman.
Waynesville	S. W. S.	2.83	7.70	3.42	5.90	2.23	4.19	1.10	1.68	1.60	0.43	3.65	2.73	37.46	E. B. Michener.
Westerville	V. O.	1.81	4.37	2.39	4.06	1.74	2.85	3.07	2.31	1.69	0.49	3.00	2.34	30.12	John Haywood.
West Milton	V. O.	3.50	10.75	4.50	6.00	5.00	6.75	1.88	5.00	3.00	1.75	7.50	6.50	62.13	L. S. Motte.
Weymouth	S. W. S.	1.76	6.04	2.05	2.96	2.54	4.43	0.92	1.43	2.26	1.37	3.19	2.32	31.27	Dr. F. Young.
Wooster	S. W. S.	.....	.....	2.71	2.99	3.48	5.78	0.94	1.80	2.08	1.10	2.21	2.68	.....	Dr. O. N. Stoddard.
Yellow Springs	V. O.	2.40	5.88	2.45	4.83	3.30	1.71	1.00	2.42	1.48	0.45	3.45	3.31	32.68	Charles W. Rice.
Youngstown	S. W. S.	1.12	6.66	2.74	1.80	2.11	2.86	1.54	2.23	2.01	0.68	1.31	1.14	26.20	A. G. Frost.
Oregon:															
Albany	V. O.	12.58	4.50	9.03	4.55	2.91	1.21	0.00	0.09	1.67	0.97	5.92	14.21	57.64	John Briggs.
Ashland	S. S.	4.98	2.71	0.99	3.39	1.15	0.74	0.33	0.04	0.66	0.56	0.94	3.38	19.87	Signal Service.
Astoria	S. S.	18.24	8.51	16.11	6.83	7.33	0.63	0.72	0.49	4.82	3.66	8.11	16.64	92.09	Do.
Bandon	V. O.	16.28	5.17	7.07	6.47	5.11	0.47	0.15	0.05	1.15	1.43	6.57	14.54	64.46	George Bennett.
Eola	V. O.	9.86	4.39	6.41	3.01	3.37	0.89	0.00	.....	1.87	0.88	3.10	9.29	.....	Thomas Pearce.
East Portland	V. O.	.....	9.00	6.34	3.00	1.00	1.06	.....	0.03	4.08	0.06	4.08	12.10	.....	Dr. George Wigg.
Klamath, Fort	S. S.	5.64	5.98	0.86	1.80	0.85	0.40	0.70	0.57	0.34	0.32	1.66	4.33	23.45	Signal Service.
Do	M. P.	4.44	5.88	0.57	1.61	0.83	0.35	0.57	0.51	0.32	0.13	1.50	2.87	19.58	U. S. post hospital.
La Grande	V. O.	5.18	0.70	2.25	1.29	0.56	2.90	0.33	0.49	0.55	0.51	1.32	3.73	19.81	Rev. J. K. Romig.
Lake View	S. S.	2.15	2.23	1.06	1.80	1.05	1.38	b0.30	0.54	0.09	b0.01	d0.32	1.51	12.44	Signal Service.
Linkville	S. S.	2.18	1.47	0.49	1.59	0.54	0.94	0.51	0.42	0.05	T	0.72	1.86	10.77	Do.
Mount Angel	V. O.	15.36	3.72	10.30	6.93	4.42	2.29	0.00	0.33	2.35	2.00	.....	.....	.....	Rev. F. Barnabas Held.

Monthly and annual precipitation at Signal Service, State weather service, Military Post, Central and Southern Pacific R. R. stations, 1887—Continued.

State and Stations.	Character of station.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Annual.	Authority.
Oregon—Continued.															
Portland	S. S.	12.31	2.81	8.00	5.06	4.77	1.44	0.03	0.58	3.06	1.34	3.43	11.34	54.17	Signal Service.
Roseburgh	S. S.	8.64	6.24	2.38	3.79	1.53	0.89	0.07	0.08	0.51	1.13	3.19	8.89	37.34	Do.
Pennsylvania:															
Altoona	V. O.	0.52	4.40	0.52	2.35	3.14	3.90	3.13	1.33	2.96	0.90	1.07	1.16	25.38	Charles B. Dudley.
Bethlehem	V. O.	.....	.....	1.86	2.08	2.79	4.87	8.58	3.47	2.78	1.12	1.32	.....	.....	Lerch and Rice.
Blooming Grove	V. O.	3.50	3.50	1.90	4.25	5.20	5.30	10.90	5.20	2.00	2.25	2.40	3.10	49.50	John Grathwohl.
Catawissa	V. O.	2.68	3.87	.....	.....	3.40	4.45	1.70	4.12	5.14	0.56	1.66	2.00	.....	W. Yetter.
Corry	V. O.	2.84	6.79	2.07	2.75	2.03	2.49	2.76	4.42	3.49	5.45	2.99	2.19	40.27	William Loveland.
Drifton	V. O.	3.49	3.12	0.67	3.02	2.84	4.85	5.91	5.17	2.37	1.16	2.10	3.91	38.61	H. D. Miller.
Dyberry	V. O.	4.00	4.89	3.55	2.20	2.62	3.91	9.28	5.03	2.18	1.24	2.60	4.19	45.69	Theodore Day.
Easton	V. O.	5.01	5.79	3.34	2.25	3.96	6.10	11.28	4.30	3.24	1.41	1.55	6.01	54.24	Dr. J. W. Moore.
Erie	S. S.	3.66	8.50	3.06	2.55	2.96	5.21	0.80	3.54	3.17	4.43	4.13	3.13	45.14	Signal Service.
Fallsington	V. O.	2.92	.....	2.98	2.61	3.61	4.28	9.28	2.52	4.14	3.06	.....	.....	.....	Milnor Gillingham.
Franklin	V. O.	2.65	9.24	2.57	3.00	3.04	4.40	1.66	5.18	2.44	1.38	2.44	2.16	40.16	Joseph Bell.
Germantown	V. O.	.....	.....	.....	2.91	2.05	7.40	10.84	2.26	4.48	0.26	1.45	7.15	.....	Thomas Meehan.
Grampian Hills	V. O.	2.57	7.62	2.49	3.26	3.38	7.02	3.55	3.65	3.50	0.81	2.28	3.12	43.25	Nathan Moore.
Philadelphia	S. S.	3.23	4.43	2.59	2.00	0.62	6.81	7.14	2.31	4.92	1.68	1.38	5.06	42.17	Signal Service.
Phillipsburgh	V. O.	6.50	10.20	4.00	4.80	3.00	5.90	6.40	2.63	4.60	0.35	1.36	1.77	51.51	L. Ray Morgan.
Pittsburgh	S. S.	1.92	6.52	1.49	4.29	5.78	4.50	2.51	2.16	2.03	0.39	1.37	1.99	41.95	Signal Service.
Quakertown	V. O.	3.86	4.05	2.08	1.79	2.99	4.56	9.25	4.75	3.52	1.70	1.56	6.05	46.18	J. L. Heacock.
Reading	V. O.	.....	.....	.....	.....	.....	.....	5.67	1.61	3.90	1.45	1.09	3.89	.....	C. M. Dechant.
State College	V. O.	0.96	5.15	1.08	2.23	2.11	3.65	4.68	2.10	3.60	0.46	1.44	2.25	29.82	Agricultural Experiment Station, State college.
Wellsborough	V. O.	4.40	5.04	0.66	2.42	3.70	3.96	7.03	2.61	2.42	2.54	2.09	1.30	38.17	Hiram D. Deming.
West Chester	V. O.	3.95	5.55	3.66	3.51	4.06	6.72	11.27	2.49	5.67	1.76	2.18	6.81	57.58	Dr. Jesse C. Green.
Wilkes Barre	V. O.	.....	.....	1.73	2.16	.....	6.06	8.76	4.15	1.48	.....	1.73	3.61	.....	Rev. F. B. Hodge.
Wysox	V. O.	0.66	3.53	1.44	2.16	2.49	2.03	.....	.....	.....	.....	.....	.....	.....	CharleaBeecher.
Rhode Island:															
Block Island	S. S.	6.96	7.02	4.49	3.49	0.51	2.75	7.52	3.13	2.00	2.28	1.68	2.70	44.55	Signal Service.
Bristol	N. E. M. S.	6.50	4.77	3.97	3.70	2.06	3.57	3.72	4.55	1.50	2.64	2.24	4.21	43.62	N. G. Herreshoff.
Lonsdale	N. E. M. S.	6.58	5.46	4.88	3.96	2.58	4.33	6.52	6.40	1.52	2.49	2.31	4.00	50.97	G. W. Pratt.
Narragansett Pier	S. S.	6.73	6.28	4.15	4.01	1.05	4.35	4.16	3.32	3.14	3.03	2.47	4.94	47.64	Signal Service.
Pawtucket	N. E. M. S.	5.96	6.16	4.56	4.34	2.74	4.36	6.51	5.52	1.56	2.48	1.96	4.24	49.81	J. H. Walker.
Providence	N. E. M. S.	6.61	5.87	.....	4.40	2.29	.....	6.09	.....	.....	.....	2.16	4.20	.....	City Engineer's Office.
Do	N. E. M. S.	6.19	5.23	4.45	3.29	2.24	4.55	5.80	5.33	1.39	2.81	2.16	4.36	48.30	D. W. Hoyt.
Woonsocket	N. E. M. S.	6.52	5.11	5.26	3.01	2.13	3.60	5.42	5.96	1.41	2.56	2.65	4.90	48.55	A. Wagner.
South Carolina:															
Abbeville	S. W. S.	2.33	4.81	3.89	1.18	2.28	4.19	9.12	16.50	1.32	3.06	0.47	5.30	45.05	J. C. Klugh.
Aiken	V. O.	4.48	3.89	0.98	2.77	3.84	3.99	.....	.....	.....	7.50	0.86	4.74	.....	W. H. Geddings, M. D.
Allendale	C. B.	.....	.....	.....	.....	2.02	3.02	9.42	2.48	0.12	6.76	.....	.....	.....	Signal Service.

Anderson	C. B.					2.19	5.53	7.68	8.96	0.70	3.34				Do.
Do	S. W. S.	1.64	4.61	2.44	0.96	2.73	4.02	7.90	10.47						Del. Kemper.
Batesburgh	C. B.					3.29	4.71	11.19	8.39	0.56	6.51				Signal Service.
Belfast	S. W. S.			1.58	3.88	3.12	3.23	7.10	3.31	0.35	9.80	1.64	4.91		Pinckney Brown.
Bennettsville	S. W. S.		2.41	1.71	4.47		1.13	6.70	7.20						J. H. Wells.
Blackville	C. B.; S. W. S.					2.05	2.87	13.62	4.73	0.49	3.61	2.63	4.17		S. S. Turner.
Branchville	C. B.					4.84	3.08	6.57	1.27	1.30	4.16				Signal Service.
Brewer Mines	S. W. S.			[1]1.57	0.83	4.62	3.83	4.81	13.70	0.83	9.17	0.41	3.97		N. Neilsen.
Charleston	S. S.	4.30	2.29	0.50	3.53	4.26	4.54	7.74	4.12	1.31	3.55	0.64	7.91	44.69	Signal Service.
Cheraw	C. B.; S. W. S.	2.50	2.93	1.56	1.75	3.23	3.27	7.88	10.10	0.54	10.11	0.77	4.05	48.79	W. R. Godfrey.
Chester	C. B.					1.96	3.64	6.74	11.93	1.28	4.71				Signal Service.
Columbia	C. B.					3.29	4.77	7.98	7.12	0.58	7.43				Do.
Do	S. W. S.	3.46	2.32	1.52	2.17	3.01	[a]3.97	6.04	5.21	0.56	7.43	0.55	3.73	39.97	Central Office.
Florence	C. B.; S. W. S.		2.33	1.34	2.49	4.05	2.19	6.45	3.75	1.00	3.09	1.73			P. H Walshe.
Greenville	C. B.					3.15	3.53	4.05	12.12	1.72	2.82				Signal Service.
Greenwood	C. B.					4.29	2.99	3.13	7.05	2.56	4.01				Do.
Hardeeville	C. B.; S. W. S.					3.33	3.36	7.94	4.01	0.85	2.63	0.42	6.22		Signal Service, W. J. Evans.
Jacksonborough	C. B.					2.13	1.83	2.79	6.01	0.41	2.15				Signal Service.
Kingstree	C. B.					[e]3.68	4.60	[a]3.45	4.48	[e]1.23	[b]7.17				Do.
Kirkwood	V. O.	3.13	2.27	1.37	1.91	2.14	1.92	4.13	2.23	0.80	7.23	0.55	3.54	31.22	Colin Macrae.
Marion	S. W. S.	3.33	1.51	1.73	2.24	3.85	2.27	5.56	5.13	[g]2.69	7.64	1.04	3.47	40.46	S. H. Price, B. G. Gregg, Ph. D.
Newberry	S. W. S.					2.12	5.72	7.86	6.86	1.83	4.89	0.26	5.15		W. G. Petersen.
Saint George's	C. B.					2.92	3.44	8.56	5.48	1.51	4.10				Signal Service.
Saint Matthew's	C. B.					[d]4.04	2.21	6.84	6.78	0.43	6.28				Do.
Spartanburgh	C. B.					1.44	2.69	5.18	9.11	1.45	4.37				Do.
Do	V. O.	2.58	5.32	3.07	T	1.72	5.51	6.66	7.84	2.41	3.48	0.23	4.12	42.89	John F. Bayerly.
Statesburgh	V. O.	3.50	1.89	0.97	1.81	3.63	2.10	4.90	4.98	0.75	8.15	0.93	3.31	36.92	W. W. Anderson, M. D.
Winnsborough	S. W. S.			2.20	1.32	2.15	4.80	6.99	7.68	1.80	5.41	0.18	4.59		James Pagan.
Yamassee	C. B.					4.41	2.19	12.03	5.24	0.65	3.70				Signal Service.
Tennessee:															
Andersonville	S. W. S.	3.08	6.83	2.44	4.74	5.49	2.17		3.11	1.74	2.20	0.94	5.24		J. K. P. Wallace.
Arlington	C. B.					[b]1.01	1.70	1.70	[b]2.10	2.20	1.70				Signal Service.
Ashwood	V. O.	4.41	7.20	4.56	1.65	2.60	1.26	3.34	2.51	2.58	2.81	1.51	5.96	40.39	C. F. Williams.
Austin	V. O.	3.72	12.57	4.54	2.01	3.32	1.29	2.23	1.85	2.62	2.07	1.50	3.78	41.60	P. B. Calhoun.
Beech Grove	S. W. S.	5.23	8.03	3.79		0.76	3.36	2.88	3.33		2.88	0.48	4.29		A. B. Robertson.
Bolivar	C. B.					0.13	1.76	1.27	0.20	1.05	2.12				Signal Service.
Brownsville	C. B.					1.25	1.55	1.46	3.07	1.58	1.57				Do.
Careyville	S. W. S.	4.43	9.05	3.86	4.81	5.56	3.64								David Hunt, M. D.
Carthage	S. S.	4.80	10.12	3.97	1.74	2.04	1.36	5.63					3.50		Signal Service.
Chattanooga	S. S.	5.60	7.16	4.52	3.06	6.57	2.18	5.39	3.13	3.60	3.41	1.08	5.46	51.07	Do.
Columbia	S. S.		4.78	2.56	0.21	2.18	0.34	6.33	0.16	1.84	0.24	0.14	0.29		Do.
Cookeville	S. W. S.	3.67	7.48	3.82	2.57	3.47	1.73	3.00	1.75	2.88	2.76	1.80	3.38	43.31	H. C. Taylor, Rutledge Smith.
Covington	S. W. S.	4.01	6.88	4.35	2.53	2.04	2.99	2.73	1.96	1.99	1.36	3.80	4.55	39.19	James Hall.
Do	C. B.					1.21	1.18	1.17	2.07	2.80	1.07				Signal Service.
Dyersburgh	C. B.					2.06	2.44	2.92	2.70	4.59	0.68				Do.
Farmingdale	S. W. S.	5.80		4.26	3.17	4.40	2.94	3.93	3.29						Lewis Boynton.
Fayetteville	S. W. S.		7.54	2.97	3.20	2.74	3.69	5.31	2.63	1.45	3.22	0.90	3.50		John C. Diemer.
Florence Station	S. W. S.	5.02	7.98	5.41	1.78	1.60	2.20	4.45	3.35	4.72	2.48	1.40	5.80	46.20	C. F. Vanderford.
Fostoria	S. W. S.	6.40	7.00	1.60	3.60	4.40	2.40	4.40	3.05	4.60	5.60	0.80	3.70	52.55	Charles Foster.
Grand Junction	C. B.					0.99	2.51	5.86	0.81	1.15	2.95				Signal Service.
Greenville	S. W. S.	2.90	5.65	2.88	4.08	3.40	1.61	3.54	3.61	1.34	3.20	0.75	2.92	35.88	H. W. Farnsworth.

Monthly and annual precipitation at Signal Service, State weather service, Military Post, Central and Southern Pacific R. R. stations, 1887—Continued.

State and stations.	Character of station.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Annual.	Authority.
Tennessee—Continued.															
Grief	S. W. S.	5.34	7.14	3.18	2.79	4.47	3.01	5.67	3.28	.....	3.67	1.00	4.06	.....	J. T. Cowden.
Hohenwald	S. W. S.	5.04	8.21	3.80	2.37	5.06	4.43	2.79	3.19	2.80	2.77	1.75	5.61	47.82	R. Downey.
Johnsonville	S. S.	7.47	9.02	3.44	0.53	1.18	1.48	3.25	3.79	3.43	3.13	1.35	.....	.....	Signal Service.
Knoxville	S. S.	3.99	6.67	3.97	4.33	4.79	3.07	2.93	4.48	1.63	2.70	0.93	3.49	42.98	Do.
McKenzie	S. W. S.	3.10	5.35	2.00	1.10	0.80	2.50	3.00	.....	2.00	1.30	.....	.....	.....	C. Hawkins.
Manchester	S. W. S.	5.42	7.33	2.92	3.34	1.22	4.11	.....	.....	.....	.....	.....	.....	.....	Wiley Hickerson.
Memphis	S. S.	5.00	8.37	4.18	2.34	2.83	1.04	3.30	1.21	2.15	2.24	4.06	5.80	42.52	Signal Service.
Milan	V.O.	4.92	6.75	3.37	1.38	2.65	2.66	2.39	6.28	2.57	1.22	3.09	3.60	40.88	Dr. M. D. L. Jordan.
Do	C.B.	.....	.....	.....	.....	1.96	2.32	2.16	6.36	2.60	1.30	.....	.....	.....	Signal Service.
Nashville	S. S.	5.13	8.47	3.36	2.67	3.43	2.31	3.77	2.89	6.85	1.92	2.29	5.31	48.40	Do.
Paris	C.B.	.....	.....	.....	.....	1.60	3.74	1.84	2.27	1.97	0.24	.....	.....	.....	Do.
Parksville	S. W. S.	4.68	5.71	3.38	3.09	.....	4.70	4.45	3.38	1.82	.....	0.00	3.33	.....	J. C. Williamson.
Riddleton	S. W. S.	5.30	13.08	4.87	2.54	3.40	2.93	4.27	1.86	2.54	1.69	2.11	4.91	49.51	S. P. Fergusson.
Rodgersville	S. W. S.	4.02	8.93	4.50	5.76	4.36	2.04	2.99	6.43	1.93	2.66	0.54	2.84	47.00	S. M. Miller, M. D.
Savannah	S. W. S.	5.70	7.41	3.98	3.95	2.88	5.36	3.91	1.97	...	.....	1.76	6.45	.....	H. R. Hinkle.
Trenton	S. W. S.	4.97	8.23	2.86	1.68	3.17	2.21	2.73	2.83	3.50	1.99	2.77	4.01	40.95	A. S. Currey.
Waverly	S. W. S.	3.90	9.71	3.29	0.81	2.56	4.94	2.02	3.20	2.22	1.41	1.55	2.06	37.67	Levi McCallum, R. F. Shannon.
Waynesborough	S. W. S.	6.65	7.10	4.45	2.79	4.00	2.70	1.94	3.20	2.07	3.40	1.30	5.35	44.95	C. Buchanan, M. D.
Texas:															
Abilene	S. S.	0.06	1.21	0.03	2.45	3.95	3.26	2.71	1.10	2.64	4.77	0.87	1.58	24.63	Signal Service.
Austin	V.O.	0.28	1.71	1.76	T	6.12	1.60	T	1.67	2.82	3.64	1.78	2.13	23.51	Oscar Samostz.
Do	C.B.	.....	.....	.....	.....	4.91	1.60	0.00	1.06	1.35	2.65	.....	.....	.....	Signal Service.
Belton	C.B.	.....	.....	.....	.....	6.47	2.32	0.89	2.14	2.84	1.56	.....	.....	.....	Do.
Brenham	C.B.	.....	.....	.....	.....	3.25	3.97	0.76	2.85	3.21	3.74	.....	.....	.....	Do.
Brownsville	S. S.	0.22	0.68	2.87	0.07	3.94	13.80	0.33	1.45	13.65	16.27	1.70	4.89	59.87	Signal Service.
Cedar Hill	V.O.	0.01	3.00	0.50	0.50	3.00	3.00	1.00	19.00	4.00	6.50	5.00	0.70	46.21	J. P. Berry.
Cleburne	V.O.	0.43	1.74	0.32	2.34	5.30	2.27	3.17	16.30	4.68	2.42	2.03	0.86	41.26	T. C. Osborne, M. D.
Columbia	C.B.	.....	.....	.....	.....	2.65	3.08	8.73	3.92	7.35	1.57	.....	.....	.....	Signal Service.
Comanche	V.O.	0.50	3.00	0.50	2.50	10.00	6.40	4.50	4.00	10.00	2.40	2.50	3.26	49.56	E. V. Weisendanger.
Comfort	V.O.	0.00	1.28	0.35	0.34	2.30	4.06	0.14	4.81	.....	.....	.....	.....	.....	Dr. F. K. Pettersen.
Concho, Fort	M. P.	0.00	0.10	0.00	1.76	2.86	0.66	0.93	1.88	2.87	1.74	0.68	0.98	14.46	U. S. post hospital.
Corpus Christi	S. S.	.....	0.17	1.61	T	1.26	3.80	0.10	2.84	9.24	2.99	0.66	5.07	.....	Signal Service.
Corsicana	V.O.	0.14	1.11	0.75	0.64	4.64	2.68	1.60	8.17	4.37	1.47	5.62	2.96	34.15	W. H. Hamilton.
Do	C.B.	.....	.....	.....	.....	4.08	2.26	1.64	6.05	3.03	3.01	.....	.....	.....	Signal Service.
Cuero	C.B.	.....	.....	.....	.....	5.59	2.94	0.98	1.62	3.16	3.60	.....	.....	.....	Do.
Dallas	C.B.	.....	.....	.....	.....	6.52	1.05	5.67	7.98	3.02	2.02	.....	.....	.....	Do.
Davis, Fort	S. S.	0.01	0.03	T	0.20	0.61	1.17	3.74	3.11	7.08	0.50	1.80	0.25	18.50	Do.
Elliott, Fort	S. S.	0.01	0.06	0.19	6.06	7.01	2.59	0.92	3.52	1.67	0.69	0.23	0.08	22.83	Do.
El Paso	S. S.	0.03	0.15	0.32	0.09	0.13	0.34	0.73	1.68	0.94	0.78	0.56	1.01	6.76	Do.
Do	R. R.	T	0.00	0.60	T	0.00	T	....	.....	0.48	0.84	0.56	1.02	.....	Pacific railroad system.

Galveston	S. S.	1.19	1.86	1.96	0.01	4.84	8.28	1.62	6.43	2.52	4.37	0.05	10.28	43.42	Signal Service.
Gallinas	V. O.	T	0.15	0.15	0.27	4.25	5.87	0.35	2.82	2.45	2.00	0.60	2.70	21.11	S. Woodruff.
Houston	C. B.	.....	.....	.....	.....	3.36	7.81	1.38	8.57	3.72	3.99	.....	.....	.....	Signal Service.
Huntsville	C. B.	.....	.....	.....	.....	2.67	2.88	1.24	1.71	3.33	4.57	.....	.....	.....	Do.
Longview	C. B.	.....	.....	.....	.....	6.02	5.53	2.94	2.31	3.20	2.89	.....	.....	.....	Do.
McIntosh, Fort	M. P.	T	0.64	0.56	0.10	3.02	3.90	1.00	2.68	3.72	0.15	3.12	3.82	22.71	U. S. post hospital.
Midland	V. O.	0.60	T	T	1.11	.....	1.51	1.07	1.21	0.25	2.15	0.38	0.90	.....	J. C. Rathburn.
New Ulm	V. O.	1.09	2.00	1.27	0.17	3.56	2.24	2.76	1.72	3.26	2.70	0.48	4.97	26.22	C. Runge.
Palestine	S. S.	0.52	3.87	1.45	0.74	6.76	2.57	2.97	5.18	2.20	3.20	1.86	6.72	38.04	Signal Service.
Ringgold, Fort	M. P.	T	0.44	1.92	0.14	4.93	8.17	0.00	1.61	6.20	1.95	1.88	5.03	32.27	U. S. post hospital.
Rio Grande City	S. S.	0.02	0.65	2.01	0.26	4.09	8.06	T	1.65	6.89	2.12	2.04	4.38	32.19	Signal Service.
San Antonio	S. S.	0.21	0.70	0.51	0.60	2.61	2.21	0.70	3.63	1.77	2.17	2.44	2.58	20.13	Do.
Do	C. B.	.....	.....	.....	.....	1.83	1.48	0.70	3.47	1.91	2.17	.....	.....	.....	Do.
Silver Falls	V. O.	T	1.07	T	1.93	4.25	0.98	1.89	2.37	1.19	2.10	0.31	0.30	16.39	C. M. Tilford.
Tyler	C. B.	.....	.....	.....	.....	10.29	5.27	3.75	9.36	3.70	1.01	.....	.....	.....	Signal Service.
Waco	C. B.	.....	.....	.....	.....	4.80	0.12	1.70	6.80	1.66	0.00	.....	.....	.....	Do.
Weatherford	C. B.	.....	.....	.....	.....	3.00	3.43	0.74	3.82	1.21	4.11	.....	.....	.....	Do.
Utah:															
Blue Creek	R. R.	0.75	0.78	0.30	0.65	0.05	0.10	0.10	0.00	0.40	0.00	0.30	0.70	4.13	Pacific Railroad system.
Corinne	R. R.	0.87	1.35	0.70	1.70	0.35	0.30	0.35	0.25	0.15	0.00	0.18	1.10	7.30	Do.
Frisco	S. S.	0.15	0.86	0.46	1.53	0.19	0.02	1.34	0.54	0.28	0.58	0.39	0.76	7.10	Signal Service.
Kelton	R. R.	0.04	0.48	0.03	1.57	0.00	0.33	1.32	0.25	0.10	0.00	0.40	0.60	5.12	Pacific Railroad system.
Ogden	R. R.	1.80	2.28	0.49	1.88	0.08	0.25	0.43	0.43	0.55	0.15	0.00	0.80	9.14	Do.
Promontory	R. R.	1.15	0.40	0.00	.....	0.00	0.22	0.09	0.10	0.30	0.00	0.00	0.30	.....	Do.
Salt Lake City	S. S.	2.36	1.41	0.35	1.87	0.73	0.37	1.22	0.69	0.55	0.30	0.25	1.55	11.66	Signal Service.
Terrace	R. R.	0.32	0.22	0.20	0.15	0.69	0.00	0.00	0.00	0.00	0.00	0.30	0.10	1.38	Pacific Railroad system.
Vermont:															
Brattleborough	V. O.	6.58	5.60	3.63	2.50	1.88	4.20	5.44	7.63	0.91	2.46	3.42	5.28	49.58	W. H. Childs.
Burlington	V. O.	1.87	1.67	1.87	2.21	2.00	4.38	2.22	2.80	2.01	1.99	4.67	3.44	31.13	W. B. Gates.
Charlotte	V. O.	2.40	3.90	3.90	3.10	1.80	5.50	3.10	.....	.....	.....	.....	.....	.....	Miss M. E. Wing.
Chelsea	N. E. M. S.	3.71	4.35	2.48	2.61	2.28	5.98	5.66	8.45	2.23	1.21	3.72	4.04	46.70	H. L. Bixby.
Cornwall	N. E. M. S.	3.32	2.28	3.32	2.19	.....	4.30	4.44	3.68	1.60	1.29	4.76	3.37	.....	C. H. Lane.
Guilford Centre	N. E. M. S.	.....	.....	.....	.....	1.97	5.49	5.08	.....	0.54	1.65	3.81	.....	.....	J. C. Cutting.
Jacksonville	N. E. M. S.	6.43	7.05	4.49	3.51	1.40	5.58	7.11	6.68	1.66	2.56	3.57	5.72	55.76	J. W. Hatch.
Lunenburgh	V. O.	3.00	3.80	2.20	1.75	2.23	3.84	4.86	2.36	1.02	2.39	2.15	3.25	32.85	H. A. Cutting.
Marlborough	N. E. M. S.	5.53	5.96	3.90	3.40	1.30	5.57	6.38	6.74	1.15	2.56	3.42	5.31	51.22	C. A. Ames.
Newport	V. O.	5.88	4.75	3.85	2.77	1.40	3.77	6.15	2.94	1.92	1.83	1.10	1.50	37.86	Rev. E. P. Wild.
Northfield	S. S.	.....	.....	4.68	3.37	1.89	4.12	5.38	4.53	1.78	1.47	3.82	5.88	.....	Signal Service.
Strafford	V. O.	3.50	5.90	4.30	2.50	2.20	4.70	5.60	5.00	1.70	2.00	3.70	4.20	45.30	N. F. Scribner.
Townshend	N. E. M. S.	.....	0.60	7.52	2.99	4.94	3.73	8.55	6.40	1.04	1.91	3.42	5.92	.....	R. Sanderson.
Vernon	N. E. M. S.	5.38	5.79	3.54	3.58	1.24	6.18	6.12	10.27	1.22	1.57	2.84	3.62	51.35	A. Whithead.
Woodstock	N. E. M. S.	.....	.....	.....	.....	.....	4.45	5.95	4.50	.....	1.38	3.52	3.87	.....	Mrs. E. J. Doton.
Virginia:															
Bird's Nest	V. O.	2.70	3.85	4.70	2.80	2.80	1.65	5.60	8.20	1.85	6.35	1.80	5.95	48.25	C. R. Moore.
Brunington	V. O.	2.89	4.52	4.05	2.51	3.45	5.35	3.19	5.80	.....	.....	.....	.....	.....	Rev. J. R. Garlick.
Cape Henry	S. S.	2.72	2.14	4.14	2.84	3.13	2.81	6.21	16.82	3.07	6.43	3.08	3.14	56.53	Signal Service.
Chincoteague	S. S.	3.50	4.58	4.47	3.34	3.34	10.51	.....	.....	.....	.....	.....	.....	.....	Do.
Dale Enterprise	V. O.	2.42	4.72	3.03	5.21	6.54	5.36	7.05	2.87	3.58	1.55	0.65	3.14	46.12	L. J. Heatwole.
Lynchburgh	S. S.	2.64	3.51	2.58	3.29	3.59	3.65	4.92	4.73	3.11	3.31	1.01	4.28	40.62	Signal Service.
Marion	V. O.	2.88	5.00	2.82	4.20	1.37	1.92	1.75	3.90	3.46	2.88	0.79	2.61	33.58	A. T. Lincoln.
Monroe, Fort	M. P.	3.27	2.41	4.55	3.15	2.30	3.25	3.90	7.86	2.48	3.11	2.40	3.73	47.41	U. S. Post Hospital.

Monthly and annual precipitation at Signal Service, State weather service, Military Post, Central and Southern Pacific R. R. stations, 1887—Continued.

State and stations.	Character of stations.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Annual.	Authority.
Virginia—continued.															
Norfolk	S. S.	3.64	2.61	4.38	3.37	1.94	2.72	5.33	8.56	3.06	6.38	1.69	4.06	47.74	Signal Service.
Rappahannock	V. O.	2.34	5.29	7.52	5.51	8.51	6.43	1.74	1.67	0.09	6.22	1.27	7.17	53.67	W. H. Ireland.
University of Virginia	V. O.	1.79	3.58	2.11	3.01	6.03	7.04	3.37	2.96	2.58	2.51	1.00	4.42	40.40	Jas. Wearmouth.
Variety Mills	V. O.	2.16	3.91	2.97	3.11	5.34	3.27	5.15	4.91	2.73	3.30	1.02	4.04	41.91	J. H. Micklem.
Wytheville	V. O.	3.50	3.14	2.94	2.98	3.68	3.67	5.58	5.78	4.88	3.46	0.44	2.91	42.96	Howard Shriver.
Washington Territory:															
Blakely	V. O.	3.51	3.35	8.60	3.66	3.42	1.15	0.10	0.02	2.81	1.45	5.01	7.89	40.97	R. M. Hoskinson.
Canby, Fort	S. S.	11.91	6.29	14.12	6.38	4.88	0.95	0.33	0.16	3.63	2.73	7.25	15.18	73.81	Signal Service.
Kennewick	V. O.	0.18	0.67	0.35	0.44	0.35	0.40	0.00	0.24	0.25	0.20	1.36	.....	.....	Capt. A. W. Gray.
Olympia	S. S.	9.83	4.28	10.66	3.94	5.66	1.01	0.74	0.18	3.34	1.51	4.94	15.75	61.78	Signal Service.
Port Angeles	S. S.	6.20	4.68	3.65	1.16	2.11	1.12	0.56	0.14	1.15	2.89	4.52	6.07	34.25	Do.
Pyaht	S. S.	13.76	3.91	k12.43	.....	.....	.....	.....	0.07	2.48	5.49	.....	16.00	.....	Do.
Spokane Falls	S. S.	1.91	1.64	2.50	1.83	1.06	2.06	1.41	1.26	1.29	1.04	1.22	2.88	20.10	Do.
Spokane, Fort	S. S.	1.43	0.73	1.35	1.82	0.55	2.20	0.27	c0.65	.....	.....	.....	.....	.....	Do.
Do	M. P.	0.16	2.36	.....	3.20	0.50	0.95	0.10	0.44	1.24	0.40	0.64	2.38	.....	U. S. post hospital.
Tacoma	V. O.	5.81	4.08	7.77	3.91	3.42	1.03	0.14	T	2.35	1.44	4.00	10.26	44.21	Edward N. Fuller.
Tatoosh Island	S. S.	14.46	11.30	16.36	8.51	8.85	1.12	1.24	1.39	3.43	11.83	10.15	17.47	106.11	Signal Service.
Townshend, Fort	M. P.	3.80	1.19	1.75	0.90	1.66	1.29	0.12	0.15	0.95	1.47	2.00	3.45	18.78	U. S. post hospital.
Vashon	V. O.	.....	.....	.....	.....	.....	.....	0.10	0.36	1.85	1.51	3.20	10.67	.....	Ford A. Carpenter.
Walla Walla	S. S.	2.36	1.78	1.83	1.57	1.08	2.12	0.03	0.71	1.55	1.52	3.06	2.88	20.44	Signal Service.
Walla Walla, Fort	M. P.	.....	.....	2.17	1.08	0.68	1.58	0.03	0.32	0.57	0.61	1.02	1.44	.....	U. S. post hospital.
West Virginia:															
Clarksburgh	V. O.	1.63	5.19	0.76	3.42	1.38	3.80	1.29	1.73	2.51	0.87	0.66	2.23	25.47	R. T. Lowndes.
Helvetia	V. O.	3.75	7.68	3.02	4.91	3.65	8.14	2.86	3.96	3.49	1.20	1.24	2.81	46.71	Dr. C. F. Stucky.
Middlebrook	V. O.	3.27	0.80	2.55	1.20	.....	.....	.....	.....	.....	.....	0.80	0.40	.....	S. F. H. Hewit.
Parkersburgh	V. O.	1.54	7.42	1.64	5.00	3.05	4.75	2.40	0.88	2.77	0.61	1.53	2.23	33.82	T. G. Field.
Wisconsin:															
Beloit	V. O.	2.69	5.16	1.36	1.08	0.99	0.41	1.61	5.79	5.17	2.00	1.45	3.86	31.57	Beloit College Observatory.
Delavan	V. O.	4.05	5.34	1.85	0.88	3.11	0.51	3.83	3.63	4.29	2.47	1.21	4.60	35.77	George L. Coolie.
Embarrass	V. O.	2.05	4.70	1.00	2.70	2.50	4.50	4.40	4.75	5.30	4.50	1.35	5.80	43.55	J. E. Breed.
Fond du Lac	V. O.	1.26	3.52	1.13	0.61	1.79	2.47	3.09	4.98	5.21	2.20	1.27	3.39	30.92	J. C. Wedge.
Franklin	V. O.	.....	.....	.....	0.50	.....	.....	.....	0.16	4.00	2.09	0.85	3.00	.....	W. O. Silvius.
Green Bay	S. S.	2.51	2.99	1.01	1.76	0.90	2.38	4.31	2.93	3.29	3.90	1.57	4.01	32.56	Signal Service.
La Crosse	S. S.	0.25	1.36	0.26	1.94	0.50	0.98	1.77	2.21	4.35	1.62	0.81	1.32	17.37	Do.
Lancaster	V. O.	.....	.....	.....	.....	.....	.....	3.92	3.90	5.56	2.58	0.08	3.31	.....	Edward Pollock.
Madison	V. O.	3.09	4.34	2.14	0.96	2.10	1.48	5.49	3.75	6.67	3.18	1.16	4.53	38.89	Washburne Observatory.
Manitowoc	V. O.	1.82	3.55	0.93	0.96	1.04	1.82	1.90	2.76	4.74	3.37	1.17	2.91	26.47	Clasina Lüps.
Milwaukee	S. S.	2.66	3.22	1.25	1.05	1.80	0.81	5.21	2.25	4.36	2.43	0.85	4.57	30.46	Signal Service.
Prairie du Chien	V. O.	1.33	3.54	1.15	2.14	2.10	1.60	4.15	4.76	9.51	3.06	1.36	4.30	39.00	College of Sacred Heart.
Wausau	V. O.	1.54	3.74	0.28	2.78	2.78	2.00	.....	.....	.....	.....	.....	.....	.....	A. C. Clark.

Wyoming:															
Bridger, Fort	S. S.	1.44	1.24	0.33	0.37	0.71	0.16	0.58	2.21	0.41	0.48	0.27	0.70	8.90	Signal Service.
Cheyenne	S. S.	.....	.....	[a]0.14	2.20	0.94	0.80	2.71	1.90	1.25	0.49	0.29	0.35	.....	Do.
Laramie, Fort	S. S.	1.19	0.26	0.36	1.46	3.02	0.98	3.36	2.11	1.65	[b]0.38	[b]0.24	[c]0.20	14.55	Do.
Do	M. P.	0.29	0.07	0.08	0.57	1.50	0.41	1.99	1.34	0.04	0.16	0.05	0.04	6.54	U. S. post hospital.
McKinney, Fort	M. P.	.....	.....	.....	0.90	0.05	1.60	0.80	1.70	0.80	0.44	0.07	0.27	.....	Do.
Sheridan, Camp	M. P.	7.70	4.65	.....	.....	.....	.....	.....	.....	0.60	1.10	0.00	2.41	.....	Do.
Washakie, Fort	M. P.	0.43	0.15	0.40	0.78	0.41	0.21	0.81	0.70	0.35	0.93	0.10	T	5.22	Do.

APPENDIX No. 25.

Maximum velocity of the wind (in miles per hour) at stations of the Signal Service, U. S. Army, for each month of 1887.

Stations.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
Alabama:												
Mobile	35	28	29	23	32	27	36	36	42	48	36	35
Montgomery	31	28	24	22	40	20	28	24	23	24	24	24
Alaska:												
Sitka[1]	56	40	49	54	36	32	30	36	42	.....	.....	.....
Arizona:												
Apache, Fort	25	37	32	42	30	36	33	33	30	33	39	36
Grant, Fort	42	32	40	40	44	32	36	40	32	50	30	48
Thomas, Fort[2]	20	28	20	.....	.....	.....	.....	.....	.....	.....	.....	.....
Whipple Barracks	34	36	32	35	32	32	30	31	32	37	48	45
Yuma	30	41	28	31	28	25	28	26	38	32	21	40
Arkansas:												
Fort Smith	28	37	21	26	18	29	40	30	18	24	28	24
Little Rock	34	23	20	24	28	20	31	22	20	23	27	26
California:												
Bidwell, Fort	50	44	40	36	36	32	28	42	42	42	32	42
Eureka	([3])	([3])	24	40	29	28	29	25	42	30	([3])	([3])
Fresno City[4]	.....	.....	.....	.....	.....	.....	.....	[5]22	20	24	24	25
Keeler	35	35	29	44	34	44	32	30	40	42	43	40
Los Angeles	24	32	18	37	30	20	20	18	23	34	18	37
Red Bluff	36	40	28	30	29	29	36	22	36	42	36	45
Sacramento	26	33	24	30	29	30	24	24	24	33	27	40
San Diego	17	35	24	30	20	20	20	21	24	20	18	36
San Francisco	32	28	28	32	32	36	35	36	35	34	25	35
Colorado:												
Colorado Springs	98	86	68	72	72	74	54	60	60	78	78	84
Denver	56	64	44	47	28	42	36	48	42	42	36	36
Las Animas	42	52	39	48	47	36	48	36	36	33	24	48
Montrose	34	50	40	36	36	40	32	36	30	34	24	42
Pike's Peak	98	86	68	72	72	74	54	60	60	78	78	84
Connecticut:												
New Haven	26	33	34	31	20	19	18	24	25	25	36	42
New London	34	46	28	26	21	25	24	48	26	32	32	69
Dakota:												
Bismarck	30	40	44	40	40	39	37	36	36	48	59	44
Buford, Fort	47	33	57	42	46	52	48	48	35	50	60	50
Deadwood	34	32	30	23	24	34	32	24	24	25	25	20
Huron	30	33	40	48	49	39	66	39	42	38	54	48
Sully, Fort	54	44	52	48	56	42	47	48	42	44	52	43
Totten, Fort	60	48	64	42	52	54	60	54	50	48	45	42
Yankton	38	40	46	46	40	28	54	48	30	33	44	34
District of Columbia:												
Washington City	28	33	27	32	24	18	35	35	24	24	30	32
Florida:												
Cedar Keys	39	32	41	28	26	28	54	35	30	34	27	23
Jacksonville	30	32	24	39	28	28	42	34	24	34	24	36
Key West	42	35	37	38	32	24	25	34	42	36	36	32
Pensacola	28	28	24	21	22	22	36	24	36	48	20	36
Sanford[6]	28	21	25	34	27	26	.....	.....	.....	.....	.....	.....
Titusville	.....	.....	.....	.....	.....	.....	30	36	40	40	38	45
Georgia:												
Atlanta	32	38	30	37	34	28	36	35	25	28	30	33
Augusta	19	24	20	23	23	19	23	18	22	18	30	20
Savannah	29	32	25	32	23	22	36	25	30	30	23	30
Idaho:												
Boisé City	24	23	24	28	33	24	18	28	25	27	26	30
Illinois:												
Cairo	44	40	44	35	41	24	27	37	33	40	38	48
Chicago	33	42	35	38	44	34	30	30	36	44	36	30
Springfield	28	36	34	34	28	25	24	24	30	31	42	36
Indiana:												
Indianapolis	24	26	31	26	19	17	23	30	20	30	33	26

[1] *Closed September* 30, 1887.
[2] *Changed to* third order March 31, 1887.
[3] *No record.*
[4] Opened in August, 1887.
[5] 15 days.
[6] Station closed June 30, 1887.

Maximum velocity of the wind (in miles per hour) at stations of the Signal Service, U. S. Army, for each month of 1887—Continued.

Stations.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
Indian Territory:												
Sill, Fort	44	50	37	52	36	40	36	32	36	46	38	60
Iowa:												
Davenport	28	34	32	36	40	38	35	45	25	45	25	36
Des Moines	26	27	38	32	27	24	29	24	34	27	40	32
Dubuque	18	25	20	25	24	22	18	24	20	25	25	20
Keokuk	28	36	36	38	50	36	36	24	27	28	36	30
Kansas:												
Concordia	26	47	39	34	45	38	38	40	36	38	32	36
Dodge City	37	52	38	52	48	28	48	34	48	36	36	36
Leavenworth	28	30	28	29	30	20	24	33	27	27	36	28
Kentucky:												
Louisville	36	36	43	36	24	24	24	48	24	32	36	36
Louisiana:												
New Orleans	31	32	23	28	24	26	30	28	38	42	24	33
Shreveport	27	28	26	21	25	27	36	18	24	24	23	25
Maine:												
Eastport	55	47	50	50	28	30	31	52	27	37	51	54
Portland	32	28	36	36	28	27	31	45	27	36	37	51
Maryland:												
Baltimore	28	34	27	24	20	24	39	24	20	30	28	33
Massachusetts:												
Boston	48	52	44	40	30	32	29	40	30	40	42	56
Nantucket	33	40	41	53	22	32	23	36	32	40	46	36
Wood's Holl[1]	.....	.....	.....	.....	28	35	36	45	(2)	(2)	(2)	[3]58
Michigan:												
Alpena	38	38	31	32	34	26	36	29	42	39	36	39
Detroit	32	36	27	33	35	26	26	19	30	46	32	30
Escanaba	31	32	36	27	29	22	25	26	30	37	36	30
Grand Haven	40	59	35	44	39	24	24	36	33	54	42	40
Lansing	28	36	28	36	25	20	21	20	28	42	32	34
Mackinaw City	40	59	40	46	36	47	37	37	39	57	36	60
Marquette	33	33	39	37	36	25	30	30	40	42	35	36
Port Huron	42	52	33	48	30	36	36	28	40	54	36	37
Minnesota:												
Duluth	32	38	29	35	28	26	24	31	35	40	39	35
Moorhead	49	45	41	49	61	49	60	42	48	38	42	38
Saint Paul	23	26	28	29	36	38	30	29	25	35	38	26
Saint Vincent	44	32	45	30	38	36	36	30	48	42	37	38
Mississippi:												
Vicksburg	44	30	26	42	24	42	26	30	28	21	27	36
Missouri:												
Lamar	40	38	40	39	32	43	28	36	30	37	48	36
Saint Louis	40	45	38	40	28	24	20	22	24	54	54	50
Montana:												
Assinaboine, Fort	56	52	55	49	48	48	41	36	45	53	58	45
Custer, Fort	38	38	45	41	38	48	48	60	37	50	60	36
Helena	40	30	36	30	30	40	36	35	30	35	34	36
Maginnis, Fort	64	84	64	52	48	47	42	40	57	60	69	57
Poplar River	40	40	45	48	46	52	36	36	44	48	60	52
Nebraska:												
North Platte	40	52	44	52	44	36	48	54	34	36	36	37
Omaha	32	36	40	36	34	30	25	34	36	30	42	42
Valentine	44	63	65	58	66	72	70	48	48	54	64	48
Nevada:												
Winnemucca	47	40	44	38	44	40	38	44	34	24	30	39
New Hampshire:												
Manchester[4]	.....	.....	44	31	24	18	24	21	24	32	28	31
Mount Washington[5]	132	120	116	118	99	80	84	90	82	.....	.....	.....
New Jersey:												
Atlantic City	32	32	30	37	36	34	25	34	24	48	54	48
New Mexico:												
Santa Fé	23	24	15	18	10	25	26	24	28	24	25	36
Stanton, Fort	51	44	37	39	36	33	30	27	24	30	30	50
New York:												
Albany	33	32	26	24	23	21	36	24	24	36	30	27
Buffalo	58	63	36	44	26	28	30	30	36	66	45	45
New York City	32	46	34	29	16	24	36	33	30	26	48	50
Oswego	40	48	40	31	24	25	25	30	30	42	36	45
Rochester	52	54	40	40	27	27	36	25	36	56	36	48

[1] Observations began in May, 1887.
[2] Self-register out of order.
[3] For 9½ days.
[4] Observations began March, 1887.
[5] Closed October 1, 1887.

Maximum velocity of the wind (in miles per hour) at stations of the Signal Service, U. S. Army, for each month of 1887—Continued.

Stations.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
North Carolina:												
Charlotte	24	28	21	35	18	24	26	32	20	22	18	28
Hatteras	41	39	39	47	43	42	42	32	46	54	47	48
Raleigh	(1)	(1)	(1)	33	18	26	24	27	21	27	24	25
Wilmington	34	32	25	30	20	23	34	28	18	22	23	36
Ohio:												
Cincinnati	34	41	40	38	24	24	40	36	25	40	36	32
Cleveland	37	44	27	31	27	24	24	24	30	36	34	35
Columbus	38	56	51	46	32	38	45	31	30	48	32	39
Sandusky	40	48	50	52	31	41	42	36	43	46	48	42
Toledo	35	37	33	52	29	24	27	22	30	44	33	32
Oregon:												
Astoria[2]	.....	.....	32	32	24	20	19	20	30	24	30	48
Portland	27	21	27	26	27	20	17	22	24	20	28	36
Roseburgh	24	18	33	26	21	16	18	22	24	20	24	30
Pennsylvania:												
Erie	36	44	35	36	30	23	30	24	29	48	36	42
Philadelphia	41	44	38	37	30	30	34	45	36	36	44	45
Pittsburgh	32	40	34	30	24	24	39	20	20	40	30	34
Rhode Island:												
Block Island	44	52	48	56	28	30	30	36	36	48	60	72
South Carolina:												
Charleston	29	38	28	30	35	24	33	30	30	25	25	26
Tennessee:												
Chattanooga	33	44	28	32	33	30	35	34	23	25	41	36
Knoxville	40	40	34	36	23	29	36	32	32	32	36	30
Memphis	34	32	32	25	36	24	30	28	23	32	36	36
Nashville	30	41	31	29	27	33	27	36	24	30	29	31
Texas:												
Abilene	42	46	36	48	52	52	41	30	36	36	42	40
Brownsville	32	32	36	30	32	26	40	24	78	32	27	26
Corpus Christi	.....	40	35	32	37	32	40	34	45	38	60	39
Davis, Fort	33	48	28	36	30	30	30	24	24	30	40	38
Elliott, Fort	41	64	56	56	40	38	37	36	46	42	48	52
El Paso	24	21	23	23	19	25	23	25	22	17	20	26
Galveston	35	41	33	31	28	39	36	24	40	48	14	32
Palestine	40	37	36	33	31	36	30	36	26	36	48	36
Rio Grande City	28	28	24	27	38	27	21	21	33	24	24	24
San Antonio	33	36	27	36	34	28	40	30	28	35	36	32
Utah:												
Frisco	48	48	37	44	46	60	38	44	53	46	35	56
Salt Lake City	28	33	27	32	29	36	45	36	32	27	23	40
Vermont:												
Northfield[2]	.....	.....	39	46	30	27	36	30	30	45	40	40
Virginia:												
Chincoteague[3]	56	46	52	50	29	43	.....	.....	.....	.....	.....	.....
Lynchburgh	25	24	24	24	17	24	20	24	15	23	24	26
Norfolk	29	36	27	32	19	27	20	34	24	40	38	30
Washington Territory:												
Canby, Fort	56	58	60	58	72	26	25	30	56	54	88	84
Olympia	26	22	20	24	24	15	14	14	17	16	24	20
Port Angeles	23	25	29	29	29	24	31	24	23	30	20	26
Spokane Falls	31	20	25	25	19	13	12	10	7	12	24	26
Tatoosh Island	52	55	50	57	40	46	24	36	42	56	57	51
Walla Walla	45	28	45	30	35	28	24	25	26	36	30	36
Wisconsin:												
Green Bay	36	30	28	32	41	25	36	33	30	36	36	36
La Crosse	26	29	35	40	33	32	30	28	36	33	45	29
Milwaukee	38	54	40	44	48	29	40	48	33	48	48	48
Wyoming:												
Bridger, Fort	55	47	48	40	36	38	36	48	54	60	40	48
Cheyenne	(4)	(4)	40	44	39	44	52	42	45	42	42	48

[1] No record.
[2] Observatios began March, 1887.
[3] Closed June 18, 1887.
[4] No observantions.

APPENDIX No. 26.

Average velocity of the wind (in miles per hour) at stations of the Signal Service, U. S. Army, for each month and the year 1887.

The average hourly velocity is obtained by dividing the total monthly movement by 24 times the number of days in the month.]

Stations.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Annual.
Alabama:													
Mobile	9.5	8.1	7.6	8.7	7.5	7.1	6.2	5.6	7.0	7.8	6.6	8.8	7.5
Montgomery	6.8	6.8	6.3	5.7	4.6	5.2	5.0	4.3	5.1	5.5	4.4	6.6	5.5
Alaska:													
Sitka[1]	10.1	8.9	10.5	9.9	9.0	8.1	6.8	6.1	8.4	.....	.....	.....	.....
Arizona:													
Apache, Fort	6.0	8.1	7.4	8.5	9.3	8.8	6.1	5.9	6.1	6.6	5.5	5.7	7.0
Grant, Fort	7.0	8.2	7.6	8.0	7.7	7.7	5.0	4.7	5.7	7.6	4.9	6.2	6.7
Thomas, Fort[2]	3.0	4.2	3.7	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Whipple Barracks	5.4	9.5	6.0	8.2	7.7	7.8	5.8	6.6	5.4	5.4	4.0	5.8	6.5
Yuma	6.2	8.6	6.2	7.7	6.9	6.8	7.6	7.0	4.8	5.8	4.6	8.0	6.7
Arkansas:													
Fort Smith	5.8	6.7	6.0	6.3	3.8	4.1	2.4	4.1	4.0	4.4	4.5	6.0	4.8
Little Rock	8.1	6.9	5.9	7.1	4.7	4.7	4.0	4.6	4.8	6.1	5.5	6.8	5.8
California:													
Bidwell, Fort	10.8	7.0	6.7	7.8	8.0	6.4	6.4	5.8	6.2	5.4	4.4	6.8	6.8
Eureka	2.5	3.3	4.8	9.8	7.3	7.2	5.6	5.4	5.5	4.5	.....	.....	.....
Fresno City[3]	.....	.....	.....	.....	.....	.....	.....	.....	4.2	3.8	3.1	3.6	.....
Keeler	4.2	8.4	4.7	7.6	7.4	8.3	6.2	6.2	5.5	6.5	4.3	6.9	6.4
Los Angeles	5.9	7.9	5.1	5.7	6.3	6.2	5.3	5.4	5.2	5.7	5.1	6.4	5.8
Red Bluff	7.0	9.8	5.9	8.8	8.0	8.4	5.6	5.6	6.9	8.8	5.2	7.6	7.3
Sacramento	5.9	9.4	6.0	8.8	8.6	8.0	7.5	6.9	5.6	6.2	4.4	6.8	7.0
San Diego	4.7	7.4	5.7	7.1	6.8	7.4	6.6	6.1	6.2	5.4	4.6	5.7	6.1
San Francisco	6.3	8.5	7.9	10.0	11.1	12.6	13.0	11.5	8.6	7.7	5.9	6.9	9.2
Colorado:													
Denver	11.1	8.7	8.1	9.4	7.6	8.2	6.8	6.7	6.9	6.6	7.1	7.0	7.8
Las Animas	8.0	9.7	7.8	10.0	8.2	8.0	6.8	6.7	6.4	6.2	5.0	5.9	7.4
Montrose	6.0	9.9	6.4	7.1	7.6	8.5	6.2	6.2	5.5	5.0	4.4	4.5	6.4
Pike's Peak	38.5	31.3	21.3	23.9	17.6	18.5	13.7	14.7	17.9	21.1	22.3	16.3	21.4
Connecticut:													
New Haven	9.1	9.8	10.9	9.0	5.9	5.9	5.9	6.2	6.7	7.2	8.3	8.7	7.8
New London	7.1	7.5	8.3	6.0	3.8	4.7	6.7	4.9	5.2	6.5	7.4	7.7	6.3
Dakota:													
Bismarck	5.1	6.6	8.4	8.8	9.7	11.0	6.5	7.4	8.3	10.1	9.2	8.0	8.3
Buford, Fort	8.7	8.2	10.8	10.7	12.9	11.7	8.2	8.3	8.6	9.1	8.6	10.2	9.7
Deadwood	6.3	6.5	5.5	5.1	6.0	6.3	4.5	4.5	5.2	4.5	4.1	2.8	5.1
Huron	7.2	9.0	8.1	11.7	13.6	12.0	9.8	8.9	11.1	12.1	10.0	11.0	10.4
Sully, Fort	7.2	9.0	10.7	10.5	10.1	11.4	9.6	10.0	11.2	9.7	8.2	9.2	9.7
Totten, Fort	13.1	12.2	14.6	14.3	14.7	15.9	10.5	10.8	15.1	13.8	12.5	14.0	13.5
Yankton	7.4	9.5	9.1	11.4	10.2	8.2	6.4	6.0	5.4	9.0	8.0	8.6	8.3
District of Columbia:													
Washington City	6.4	6.4	8.5	6.9	4.2	4.7	4.7	4.2	4.2	5.5	5.5	6.0	5.6
Florida:													
Cedar Keys	9.3	9.6	9.1	10.5	8.5	8.2	10.0	8.7	9.9	10.0	8.1	10.3	9.4
Jacksonville	5.8	5.3	3.7	7.2	7.3	6.9	8.8	7.8	7.9	7.8	6.9	6.6	6.8
Key West	11.3	12.9	11.1	10.5	8.5	7.7	6.1	8.9	10.0	11.7	12.0	10.9	10.1
Pensacola	7.4	7.2	6.8	7.5	7.9	7.8	6.8	6.2	8.4	8.4	6.0	8.5	7.4
Sanford[4]	7.2	6.2	6.4	8.0	6.4	6.0	.....	.....	.....	.....	.....	.....	.....
Titusville[5]	.....	.....	.....	.....	.....	.....	7.8	9.9	12.4	9.6	8.3	8.3	.....
Georgia:													
Atlanta	11.6	11.2	11.9	11.0	8.1	9.1	7.9	6.4	8.5	9.5	9.1	10.8	9.6
Augusta	4.5	4.4	4.3	4.1	3.6	4.1	3.3	3.3	3.7	3.6	3.0	3.9	3.8
Savannah	8.5	7.8	8.3	8.7	7.1	6.9	6.6	7.1	7.5	7.2	5.8	6.5	7.3
Idaho:													
Boisé City	5.7	5.2	4.6	5.1	4.4	2.4	2.3	1.8	1.0	1.7	2.1	3.9	3.4

[1] Closed September 30, 1887.
[2] Changed to third order March 31, 1887.
[3] Observation began August 16, 1887.
[4] Closed June 30, 1887.
[5] Observations began July 11, 1887.

Average velocity of the wind (in miles per hour) at stations of the Signal Service, U. S. Army, for each month and the year 1887—Continued.

Stations.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Annual.
Illinois:													
Cairo	10.7	10.8	9.5	8.9	5.6	5.8	5.2	6.1	6.8	8.5	7.3	8.5	7.8
Chicago	12.4	11.1	11.1	12.2	9.3	9.0	9.6	8.8	10.9	12.1	12.8	12.3	11.0
Springfield	10.7	11.0	10.1	11.5	6.9	7.2	6.1	6.9	7.5	8.5	9.0	9.3	8.7
Indiana:													
Indianapolis	7.8	7.7	7.0	6.9	4.4	4.7	4.2	4.6	4.8	6.0	6.0	6.2	5.9
Indian Territory:													
Sill, Fort	13.3	13.3	13.1	13.8	10.4	9.4	7.8	10.0	9.8	11.3	9.3	11.1	11.0
Iowa:													
Davenport	9.6	9.4	8.6	10.8	7.3	6.6	6.2	6.5	7.4	6.5	7.4	8.5	7.9
Des Moines	7.9	8.1	8.3	8.6	7.1	5.7	4.4	4.7	5.0	7.2	7.8	8.1	6.9
Dubuque	4.2	4.4	4.4	5.5	4.8	3.3	3.8	3.8	4.5	5.4	4.8	3.9	4.4
Keokuk	10.0	10.7	9.4	11.8	7.1	7.2	6.3	6.8	8.2	8.5	9.3	9.7	8.8
Kansas:													
Concordia	8.7	7.6	8.7	8.7	8.9	8.1	6.7	7.5	8.2	8.1	7.8	8.1	8.1
Dodge City	9.8	11.6	10.3	11.9	10.3	10.6	9.2	10.1	10.9	8.8	8.4	9.8	10.1
Leavenworth	7.9	8.2	8.0	9.5	6.5	5.9	5.0	5.0	6.2	6.8	7.0	7.3	6.9
Kentucky:													
Louisville	10.7	9.4	8.3	8.5	5.6	6.8	5.6	6.5	6.5	7.7	7.4	7.8	7.6
Louisiana:													
New Orleans	9.7	8.7	7.6	7.7	7.0	6.8	4.2	5.6	7.9	9.9	6.8	8.9	7.6
Shreveport	7.4	7.7	6.8	6.4	5.2	4.3	3.3	3.4	4.4	5.0	4.4	6.0	5.4
Maine:													
Eastport	13.6	12.8	13.8	12.8	8.3	7.9	7.1	7.3	7.4	8.4	11.1	12.1	10.2
Portland	8.2	8.1	9.9	8.8	7.5	7.6	7.5	6.9	6.7	7.0	8.5	8.1	7.9
Maryland:													
Baltimore	6.2	6.6	7.9	6.9	5.1	5.7	5.5	4.9	4.4	5.5	5.6	5.6	5.8
Massachusetts:													
Boston	13.2	14.4	14.5	12.9	10.0	10.0	9.5	8.7	10.2	10.0	11.8	11.2	11.4
Nantucket	12.3	13.8	14.1	11.9	8.0	10.2	8.8	8.9	9.4	10.1	12.1	12.2	11.0
Michigan:													
Alpena	10.2	10.1	10.1	9.2	6.6	6.5	7.2	7.3	8.1	11.2	10.6	10.5	9.0
Detroit	11.2	9.8	8.7	9.6	6.7	5.8	8.0	6.6	8.1	9.7	10.9	10.5	8.8
Escanaba	8.5	8.4	9.2	8.4	7.0	7.0	7.3	7.4	8.1	10.3	9.0	9.0	8.3
Grand Haven	13.9	12.9	11.2	13.3	8.6	8.1	9.0	7.2	8.8	13.4	12.8	12.9	11.1
Lansing	9.5	9.2	7.4	8.6	5.5	5.6	5.9	4.6	5.7	7.9	8.8	8.5	7.3
Mackinaw City	11.4	12.5	8.2	10.8	8.4	7.7	8.3	7.9	10.8	14.3	14.4	14.7	10.8
Marquette	10.4	9.0	9.9	8.9	7.5	6.0	6.7	7.5	8.6	11.8	9.9	10.2	8.9
Port Huron	14.6	13.2	12.0	12.5	9.0	8.0	9.5	7.9	9.5	12.7	12.8	12.0	11.1
Minnesota:													
Duluth	6.4	7.2	5.7	7.7	5.9	5.3	6.2	6.5	7.1	7.9	7.0	8.3	6.8
Moorhead	9.5	8.9	10.1	14.1	14.2	13.0	8.4	8.8	11.0	10.4	9.4	10.3	10.7
Saint Paul	5.4	6.4	6.6	8.2	7.9	5.4	3.0	4.1	5.4	5.9	5.9	5.0	5.8
Saint Vincent	6.9	6.6	9.3	8.4	9.8	8.7	5.2	4.9	8.9	8.8	8.5	9.9	8.0
Mississippi:													
Vicksburgh	8.9	7.9	7.0	6.8	4.7	4.6	4.2	3.8	4.9	5.5	5.1	6.7	5.8
Missouri:													
Lamar	12.4	12.7	12.4	13.0	8.0	7.9	6.4	7.5	7.1	9.3	10.0	10.3	9.8
Saint Louis	12.9	11.3	9.6	13.4	6.3	6.8	6.0	6.6	7.7	11.2	11.9	12.0	9.6
Montana:													
Assinaboine, Fort	12.4	10.7	13.5	13.3	12.6	12.0	8.9	9.1	9.5	13.4	12.2	12.0	11.6
Custer, Fort	8.8	5.7	7.6	8.3	8.6	8.6	6.8	7.1	6.4	6.7	6.4	6.5	7.3
Helena	9.4	4.9	9.6	8.1	8.2	7.3	7.1	5.9	6.8	7.2	6.2	5.7	7.2
Maginnis, Fort	16.7	11.6	13.9	12.1	14.0	11.0	9.0	8.0	9.9	13.1	13.4	9.1	11.8
Poplar River	5.6	4.8	8.7	10.3	11.9	9.7	6.6	7.0	6.6	7.0	6.4	6.3	7.6
Nebraska:													
Crete	7.8	9.7	9.8	12.9	11.2	11.3	9.5	9.2	9.4	9.2	7.6	8.9	9.7
North Platte	8.1	8.0	7.4	10.2	9.9	8.1	6.8	7.4	8.1	8.7	8.1	9.2	8.3
Omaha	12.2	13.2	15.2	14.4	14.2	13.3	9.5	10.2	12.3	12.3	10.6	12.0	12.4
Nevada:													
Winnemucca	11.0	10.9	8.7	9.1	9.3	7.8	7.2	7.5	7.2	6.8	6.8	7.7	8.3
New Hampshire:													
Manchester[1]	.....	.....	9.3	7.1	5.1	4.6	4.8	4.5	4.6	5.3	6.2	6.6	.....
Mt. Washington	44.7	41.4	38.2	35.1	26.2	24.0	26.1	25.4	29.0	([2])	.....	.....	.....
New Jersey:													
Atlantic City	9.7	10.6	11.2	9.8	7.0	8.7	7.1	7.0	7.5	7.7	8.0	8.5	8.6
New Mexico:													
Santa Fé	6.3	5.8	3.8	4.3	2.1	3.1	4.5	4.6	4.1	4.5	4.5	5.3	4.4
Stanton, Fort	12.1	10.7	8.4	8.8	6.3	4.6	4.1	3.9	3.5	3.6	5.6	8.7	6.7
New York:													
Albany	7.3	8.1	8.8	7.0	4.9	4.8	5.0	4.2	5.0	5.3	7.0	5.8	6.1
Buffalo	16.6	15.2	11.0	10.9	7.0	7.1	8.1	7.1	7.2	11.7	13.9	12.1	10.7
New York City	9.4	10.7	11.0	8.4	5.2	6.2	6.0	7.3	7.3	7.7	9.8	10.1	8.3
Oswego	15.8	16.4	14.0	11.6	7.6	6.5	7.9	8.0	9.8	11.2	13.8	12.7	11.8
Rochester	14.3	14.2	13.5	13.3	8.2	7.5	8.9	8.1	9.7	11.2	13.1	11.2	11.1

[1] Observations began March 1.

[2] Closed October 1, 1887.

Average velocity of the wind (in miles per hour) at stations of the Signal Service, U. S. Army, for each month and the year 1887—Continued.

Stations.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Annual.
North Carolina:													
Charlotte	4.7	6.5	6.6	6.0	3.9	4.2	3.3	4.6	4.7	5.5	4.6	5.3	5.0
Hatteras	15.1	13.4	14.5	16.2	11.1	14.7	10.9	13.3	11.7	13.7	14.7	14.5	13.6
Raleigh	(1)	7.0	8.0	7.8	5.2	6.0	4.0	4.3	3.4	5.1	5.0	6.0	.....
Wilmington	8.3	7.7	7.9	8.4	5.9	7.2	6.5	6.9	6.1	6.3	5.4	6.5	6.9
Ohio:													
Cincinnati	9.7	9.9	9.5	8.7	5.3	5.7	4.6	6.0	7.4	7.7	7.1	7.6	7.4
Cleveland	12.4	11.1	9.6	9.6	6.9	7.0	6.3	6.4	7.4	10.4	11.7	10.8	9.0
Columbus	9.9	11.3	9.3	9.2	5.8	6.5	5.1	5.8	6.2	8.0	7.5	8.2	7.7
Sandusky	16.0	14.7	14.3	14.5	9.6	9.4	9.3	8.8	10.6	12.5	13.2	10.5	12.0
Toledo	11.7	10.5	9.2	10.2	6.2	6.9	6.9	6.0	6.9	8.0	8.9	7.8	8.3
Oregon:													
Astoria[2]	.....	.....	8.2	7.7	7.9	7.1	7.1	5.8	6.1	5.7	7.9	8.9	.....
Portland	8.5	6.6	7.2	6.4	7.1	5.5	5.6	4.7	4.4	3.7	4.6	7.2	6.0
Roseburgh	4.1	3.4	3.5	4.5	4.6	4.7	4.8	4.2	3.2	2.6	2.1	3.7	3.8
Pennsylvania:													
Erie	13.5	12.5	11.5	11.9	7.7	6.7	7.8	6.7	7.9	11.2	11.9	11.1	10.0
Philadelphia	11.6	11.7	13.9	11.7	6.9	8.4	8.5	7.7	8.4	9.7	9.8	10.6	9.9
Pittsburgh	9.5	9.2	8.2	7.0	5.3	5.2	4.7	5.0	5.4	7.2	7.8	7.7	6.8
Rhode Island:													
Block Island	18.6	19.7	18.2	17.0	9.8	11.4	11.4	10.6	12.8	14.6	19.5	19.1	15.2
South Carolina:													
Charlestown	8.1	8.6	8.9	9.4	8.2	9.4	8.4	9.6	9.3	7.9	7.1	7.7	8.6
Tennessee:													
Chattanooga	8.0	8.0	7.7	6.8	4.4	4.4	4.4	4.2	4.7	5.5	5.3	6.0	5.8
Knoxville	8.1	7.6	6.7	6.6	4.0	4.7	4.1	4.6	4.8	5.3	4.9	5.2	5.5
Memphis	8.8	7.5	7.2	7.3	5.1	5.0	4.3	5.2	5.4	6.9	6.3	6.9	6.3
Nashville	9.5	8.5	7.5	7.0	4.7	4.7	4.3	4.8	4.7	6.3	5.7	6.6	6.2
Texas:													
Abilene	16.1	13.8	13.7	14.3	11.6	11.0	10.0	9.7	9.8	11.1	9.4	11.7	11.8
Brownsville	9.8	11.4	9.0	10.2	9.0	6.4	7.2	6.5	7.0	8.7	6.5	8.1	8.3
Corpus Christi[3]	.....	13.5	12.9	16.1	15.0	14.4	11.8	12.2	12.6	12.8	9.7	11.6	.....
Davis, Fort	9.5	8.4	7.8	9.1	7.6	6.6	5.6	5.1	5.4	5.8	6.0	9.8	7.2
Elliott, Fort	12.4	14.2	13.9	14.4	12.2	11.1	9.6	10.8	11.4	10.8	9.8	12.6	11.9
El Paso	5.6	4.6	4.5	5.2	4.3	4.5	3.3	3.3	3.3	2.7	1.8	4.5	4.0
Galveston	11.0	11.7	10.4	12.6	9.8	10.8	8.5	8.5	11.2	11.5	5.3	11.3	10.2
Palestine	12.3	11.3	10.4	10.8	8.2	7.1	7.4	7.4	7.6	9.3	7.6	10.1	9.1
Rio Grande City	6.8	8.6	7.1	9.5	8.7	4.9	9.0	8.3	6.4	5.8	4.8	5.5	7.1
San Antonio	9.6	10.0	9.2	11.0	9.5	8.4	8.6	7.9	8.3	8.7	7.0	9.0	8.9
Utah:													
Frisco	10.2	14.4	9.6	11.6	12.3	14.0	10.0	12.2	11.1	10.0	7.5	9.1	11.0
Salt Lake City	5.2	8.0	5.3	6.8	6.6	6.4	5.1	6.1	5.2	4.6	4.0	4.6	5.7
Vermont:													
Northfield[4]	.....	.....	13.0	8.7	8.3	7.1	7.3	6.8	7.6	8.2	9.2	8.0	.....
Virginia:													
Chincoteague	14.9	14.2	17.7	11.0	8.5	12.8	(5)	.....	.....	.....	.....	.....	.....
Lynchburgh	4.2	4.3	6.1	4.0	2.9	2.8	1.4	2.6	2.3	3.1	3.2	2.8	3.3
Norfolk	7.7	7.6	8.6	7.6	5.5	7.2	6.6	6.4	6.5	7.8	7.4	7.0	7.2
Washington Ter.:													
Canby, Fort	14.4	14.4	16.3	12.3	12.6	8.0	7.1	6.2	8.7	11.0	14.7	18.6	12.0
Olympia	6.6	5.6	4.8	4.8	4.7	2.2	2.0	2.8	2.5	2.6	3.2	4.6	3.9
Port Angeles	4.4	5.5	4.7	6.0	5.6	6.6	7.5	5.4	4.3	3.7	3.8	4.1	5.1
Spokane Falls	6.7	3.8	5.1	4.9	4.6	3.3	2.5	2.4	2.1	2.0	3.6	6.0	3.9
Tatoosh Island	17.3	16.3	14.6	12.0	14.1	8.0	8.1	8.0	10.0	14.3	15.5	16.4	12.9
Walla Walla	11.8	4.9	7.3	8.3	6.5	6.2	5.0	5.6	5.0	4.5	4.1	8.1	6.4
Wisconsin:													
Green Bay	8.9	9.1	7.5	9.7	8.1	7.0	6.5	5.9	7.4	9.4	8.9	8.8	8.1
La Crosse	7.9	7.8	8.7	9.6	7.9	7.3	6.6	6.4	6.4	9.5	8.0	8.0	7.8
Milwaukee	12.7	13.0	11.0	11.6	8.1	6.7	7.9	8.5	10.6	12.3	12.4	12.1	10.6
Wyoming:													
Bridger, Fort	18.7	9.6	11.2	11.6	9.5	9.5	6.1	7.2	7.5	10.2	7.1	10.7	9.9
Cheyenne	(1)	(1)	11.7	12.0	12.0	11.1	10.8	8.5	8.9	10.2	10.5	10.6	.....

[1] No record.
[2] Observations began March, 1887.
[3] Observations began February, 1887.
[4] Observations began March 1.
[5] Closed June 18, 1887.

APPENDIX No. 27.

Average cloudiness, scale of 0 *to* 10, *at stations of the Signal Service, U. S. Army, for each month and the year* 1887 (*computed from tri-daily observations*).

[The monthly average is obtained by dividing the sums of the amount of cloudiness recorded daily by the number of observations taken.]

Stations.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Annual.
Alabama:													
Mobile	4.9	5.9	4.1	3.0	5.3	5.3	5.6	4.4	4.1	5.0	4.7	6.9	4.9
Montgomery	4.1	7.0	3.2	3.0	5.1	4.3	6.0	3.6	3.7	4.1	3.8	7.2	4.6
Alaska:													
Sitka[1]	7.5	5.2	7.8	7.1	7.8	7.6	7.8	7.1	7.1	.....	.....	.....	.....
Arizona:													
Apache, Fort	2.3	3.7	1.5	3.2	2.7	3.2	4.7	4.7	3.4	1.5	2.7	2.5	3.0
Grant, Fort	2.7	3.6	1.3	2.4	3.3	3.4	4.4	4.8	3.2	1.7	3.5	2.5	3.1
Thomas, Fort[2]	2.0	3.5	1.2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Whipple Barracks	2.0	2.7	1.9	3.2	2.3	1.7	3.1	2.7	2.7	1.6	2.3	2.1	2.3
Yuma	1.2	2.0	1.2	1.7	1.1	0.8	1.3	1.3	1.7	0.7	1.8	1.3	1.4
Arkansas:													
Fort Smith	3.4	6.0	3.8	4.2	4.9	3.5	3.0	3.7	3.7	3.3	2.7	5.5	4.0
Little Rock	3.3	5.8	3.2	2.3	4.1	4.0	3.6	3.8	3.5	3.1	2.1	6.5	3.8
California:													
Bidwell, Fort	6.0	7.0	4.5	5.3	4.6	3.9	1.5	1.9	2.1	1.1	3.8	5.4	3.9
Eureka	6.5	7.0	6.6	6.3	6.7	4.5	4.9	5.4	3.5	3.1	5.9	6.9	5.6
Fresno City[3]	.....	.....	.....	.....	.....	.....	.....	[4]0.0	0.7	1.0	1.7	3.5	.....
Keeler	1.9	3.5	1.9	3.4	2.2	1.7	2.1	0.3	1.1	1.5	2.6	3.0	2.1
Los Angeles	1.9	3.9	2.3	4.9	3.5	2.5	3.3	2.8	2.7	1.5	2.7	2.5	2.9
Red Bluff	4.2	5.9	3.9	4.1	3.8	2.6	0.7	0.2	1.5	1.1	3.6	5.0	3.1
Sacramento	2.3	5.3	2.3	2.9	2.1	1.0	0.3	0.1	1.3	0.5	1.8	3.5	2.0
San Diego	2.5	3.7	3.3	5.4	5.3	4.6	5.4	4.1	4.6	3.5	3.5	2.8	4.1
San Francisco	3.1	5.2	3.8	4.1	4.8	3.2	5.5	4.7	2.7	1.9	4.0	4.2	3.9
Colorado:													
Colorado Springs[5]	.....	.....	.....	.....	.....	.....	4.5	4.2	3.7	3.7	3.1	3.3	.....
Denver	3.3	2.6	4.2	5.2	4.2	4.0	4.4	4.5	3.8	3.9	2.9	3.2	3.9
Las Animas	4.2	4.1	3.7	5.0	4.3	4.1	3.9	4.3	3.3	3.5	3.2	3.6	3.9
Montrose	5.1	4.7	2.9	4.5	3.1	2.9	3.7	3.4	2.3	1.4	2.8	3.5	3.4
Pike's Peak	3.0	3.1	3.8	4.0	4.0	3.9	4.8	4.7	4.4	2.6	2.7	3.4	3.7
Connecticut:													
New Haven	6.0	6.0	5.3	6.1	4.0	5.6	6.4	5.2	5.1	5.7	3.8	5.9	5.4
New London	5.3	5.4	5.7	5.0	4.3	4.2	6.3	5.6	5.5	5.8	5.2	5.3	5.3
Dakota:													
Bismarck	4.4	4.0	5.0	6.1	3.8	4.7	4.5	5.2	3.7	5.1	3.7	4.8	4.6
Buford, Fort	5.8	5.1	6.1	7.1	5.8	6.4	6.1	6.9	4.2	4.9	5.0	5.3	5.7
Deadwood	3.7	2.9	4.3	5.2	3.9	3.5	4.7	4.9	3.1	5.2	4.2	5.1	4.3
Huron	4.3	4.8	4.8	5.5	3.2	4.3	3.9	5.0	4.1	4.0	3.2	5.6	4.4
Sully, Fort	4.4	3.8	5.9	5.4	3.8	4.5	4.4	4.9	3.3	3.8	3.3	5.0	4.4
Totten, Fort	4.6	4.2	4.8	5.4	4.1	3.9	4.2	5.2	3.6	5.1	4.1	4.5	4.4
Yankton	3.7	4.9	4.8	5.3	3.7	4.5	3.8	4.9	4.5	3.6	3.2	5.4	4.4
District of Columbia:													
Washington City	5.0	6.0	5.8	4.9	4.7	4.7	5.1	5.1	5.3	5.4	3.6	5.8	5.1
Florida:													
Cedar Keys	3.5	3.4	3.5	3.6	5.3	6.0	6.5	3.7	4.0	5.0	2.6	5.9	4.4
Jacksonville	4.3	3.7	3.3	2.8	4.2	4.8	4.9	4.3	4.1	5.1	3.9	6.4	4.3
Key West	4.1	3.1	3.4	4.0	5.3	3.1	5.9	4.9	5.6	6.5	4.2	5.3	5.1
Pensacola[6]	4.7	4.9	3.4	2.5	4.7	4.3	4.6	3.4	3.9	4.5	4.1	6.6	4.3
Sanford[7]	4.3	3.6	2.7	3.6	4.4	5.1	.....	.....	.....	.....	.....	.....	.....
Titusville	.....	.....	.....	.....	.....	5.3	4.1	2.9	4.7	5.4	3.9	5.6	.....
Georgia:													
Atlanta	4.3	6.3	3.6	3.1	5.6	4.7	6.2	4.6	4.0	4.0	3.9	6.6	4.7
Augusta	4.1	6.4	3.5	3.0	5.6	4.8	6.9	5.4	3.9	4.3	3.1	6.6	4.8
Savannah	4.3	5.6	3.0	2.5	4.4	4.7	5.2	3.9	3.4	4.7	3.4	5.9	4.2

[1] Closed October 1, 1887.
[2] *Made station of 3d order April 1.*
[3] *Observations began August, 1887.*
[4] *For 16 days.*
[5] Established July, 1887.
[6] Closed June 30, 1887.
[7] Observations began June, 1887.

Average cloudiness, scale 0 *to* 10, *at stations of the Signal Service, etc.*—Continued.

Stations.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Annual.
Idaho:													
Boisé City	7.1	6.5	5.6	6.1	4.4	4.4	2.0	1.9	2.3	2.4	4.0	6.3	4.4
Illinois:													
Cairo	5.6	6.3	5.2	4.3	5.5	4.9	3.7	3.9	5.3	3.5	3.8	6.6	4.9
Chicago	6.4	6.8	5.2	4.6	3.8	4.2	3.0	4.1	5.9	4.9	5.2	7.5	5.1
Springfield	5.2	6.0	4.6	4.2	4.7	4.1	3.2	4.4	5.5	3.9	3.0	6.3	4.6
Indiana:													
Indianapolis	6.2	7.6	6.0	4.8	4.3	4.3	3.7	4.2	5.5	4.5	4.3	6.5	5.2
Indian Territory:													
Sill, Fort	1.9	3.9	2.0	3.0	3.9	3.5	2.5	3.5	3.9	2.2	2.7	3.8	3.1
Iowa:													
Davenport	5.1	5.8	4.9	4.7	4.4	4.7	3.5	5.0	5.2	3.5	3.6	5.4	4.6
Des Moines	4.0	5.8	4.1	4.6	3.2	4.0	3.3	4.7	5.0	3.5	3.9	5.9	4.4
Dubuque	4.4	5.5	4.4	4.3	3.5	4.4	3.6	4.9	5.3	3.8	4.3	6.7	4.6
Keokuk	4.6	6.0	4.4	3.9	4.2	3.7	2.7	4.1	4.6	3.2	3.3	4.7	4.1
Kansas:													
Concordia	3.4	4.9	3.2	4.1	3.9	5.0	3.7	5.3	4.5	2.9	3.2	4.0	4.0
Dodge City	2.6	4.7	2.0	3.1	3.1	4.1	2.7	4.5	3.2	2.1	2.1	2.5	3.1
Leavenworth	4.4	5.6	3.9	3.9	4.5	4.1	2.6	4.8	5.1	2.8	3.5	4.2	4.1
Topeka	.....	.....	.....	.....	.....	4.1	2.7	4.8	5.2	2.7	3.9	4.5	.....
Kentucky:													
Louisville	5.8	7.3	5.5	4.4	4.6	3.7	3.6	3.6	5.1	3.6	4.0	6.9	4.8
Louisiana:													
New Orleans	4.3	5.5	3.3	3.0	4.1	4.3	4.6	3.6	3.3	4.4	3.3	6.7	4.2
Shreveport	3.2	5.9	2.1	2.2	3.7	3.4	3.6	3.9	3.1	3.1	3.9	7.0	3.8
Maine:													
Eastport	6.3	5.3	6.2	4.9	4.6	3.9	3.8	4.0	3.6	4.9	5.5	5.1	4.8
Portland	6.1	5.5	6.2	5.0	4.4	4.8	4.7	3.7	4.5	5.6	5.3	5.9	5.1
Maryland:													
Baltimore	4.8	6.2	6.2	5.1	4.2	4.6	5.0	5.1	5.2	5.3	4.0	5.6	5.1
Massachusetts:													
Boston	6.0	5.9	6.1	4.9	4.1	5.1	5.4	4.1	3.7	5.5	4.2	5.9	5.1
Nantucket	6.1	5.5	5.9	4.6	3.8	3.4	4.3	3.4	4.9	5.9	5.1	6.3	4.9
Wood's Holl [1]	.....	.....	.....	.....	4.1	3.7	4.5	4.4	4.9	6.0	4.2	6.1	.....
Michigan:													
Alpena	7.6	7.3	5.3	6.3	3.8	4.9	4.6	4.7	4.3	6.8	7.3	8.8	6.0
Detroit	6.7	7.4	5.6	5.7	4.2	4.7	3.5	4.4	5.5	6.7	6.0	7.9	5.7
Escanaba	5.3	6.2	4.2	5.9	3.3	5.2	4.5	4.5	4.1	6.3	6.5	8.0	5.3
Grand Haven	8.2	7.8	5.6	6.1	3.6	5.8	3.8	5.0	5.2	6.3	6.5	9.0	6.1
Lansing	6.4	7.7	5.3	4.5	3.5	4.8	3.4	4.2	4.8	5.9	6.1	8.2	5.4
Mackinaw City	6.2	6.0	4.8	5.7	3.3	5.7	4.5	4.1	3.8	7.0	6.8	8.9	5.6
Marquette	6.3	6.1	5.4	5.6	3.3	5.4	4.7	5.2	4.5	6.8	7.1	8.5	5.7
Port Huron	7.3	7.1	5.7	6.2	4.0	4.7	3.5	4.7	5.6	6.3	6.2	8.0	5.8
Minnesota:													
Duluth	4.6	5.2	4.4	5.2	3.1	3.6	4.9	4.9	4.5	5.3	5.9	6.3	4.8
Moorhead	5.0	5.9	5.9	6.2	5.0	5.1	4.8	5.6	4.1	5.0	4.8	6.2	5.3
Saint Paul	4.7	5.1	4.9	5.8	4.1	5.0	5.2	6.6	5.4	5.2	5.7	7.5	5.4
Saint Vincent	4.5	4.6	5.1	5.6	4.7	4.6	4.6	5.0	3.6	4.9	4.3	5.0	4.7
Mississippi:													
Vicksburg	4.2	6.4	3.1	2.8	4.5	3.9	5.0	3.9	3.2	4.2	4.5	7.6	4.4
University [2]	.....	.....	.....	.....	.....	3.8	4.0	2.9	3.7	3.2	3.5	6.8	.....
Missouri:													
Lamar	4.1	5.2	4.3	3.9	4.5	3.7	2.3	5.2	5.8	2.7	3.1	5.1	4.1
Saint Louis	4.3	6.5	4.6	4.2	4.8	3.7	2.8	3.8	4.8	3.1	2.8	6.3	4.3
Montana:													
Assinaboine, Fort	5.9	4.5	5.1	5.5	3.9	5.5	3.1	4.9	3.7	4.6	5.4	6.0	4.8
Custer, Fort	6.6	4.9	5.7	6.3	4.6	4.5	3.7	3.9	2.9	4.5	4.4	5.4	4.8
Helena	7.3	5.5	5.3	7.3	4.3	5.2	2.7	4.5	2.9	3.8	3.8	6.5	4.9
Maginnis, Fort	5.8	5.1	5.4	6.6	4.3	5.2	3.3	5.1	3.7	4.9	5.8	7.0	5.2
Poplar River	4.5	3.1	4.5	5.2	3.7	3.7	4.0	4.4	3.0	4.0	3.6	4.0	4.0
Nebraska:													
Crete [3]	.....	.....	.....	.....	.....	.....	4.5	5.4	5.3	4.1	3.6	5.3	.....
North Platte	3.1	3.9	3.9	4.3	3.3	4.2	3.3	4.2	3.7	3.6	3.2	4.0	3.7
Omaha	4.3	4.8	4.8	5.4	3.8	5.5	3.6	4.7	5.4	3.7	3.8	5.2	4.6
Valentine	4.4	3.7	4.5	5.4	3.3	4.4	4.0	5.1	4.2	3.6	3.8	5.0	4.3
Nevada:													
Winnemucca	4.3	5.7	2.9	4.3	2.8	2.9	1.5	1.1	1.9	1.1	2.2	4.4	2.9
New Hampshire:													
Manchester [4]	.....	.....	5.8	4.8	4.3	5.4	6.1	4.2	3.9	4.9	4.4	5.6	.....
Mount Washington [5]	4.3	3.9	3.8	4.3	4.0	4.4	4.2	3.8	3.0	.....	.....	.....	.....
New Jersey:													
Atlantic City	4.4	4.8	4.3	4.3	2.6	3.6	3.1	3.6	4.5	5.8	4.8	5.0	4.3
New Mexico:													
Santa Fé	2.0	3.1	2.0	3.4	3.2	3.6	4.2	3.6	4.2	1.8	2.7	3.4	3.1
Stanton, Fort	1.3	2.6	1.7	2.0	2.1	2.9	3.8	4.0	3.1	2.3	1.9	3.0	2.6

[1] Observations began May, 1887.
[2] Observations began June, 1887.
[3] Observations began July, 1887.
[4] Observations began March, 1887.
[5] Closed October 1, 1887.

Average cloudiness, scale 0 to 10, at stations of the Signal Service, etc.—Continued.

Stations.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Annual.
New York:													
Albany	6.5	6.7	5.7	5.1	3.7	5.8	5.4	4.3	5.2	6.5	6.1	6.3	5.6
Buffalo	8.3	7.6	6.6	4.8	4.0	4.9	3.5	3.6	4.7	5.7	6.3	7.6	5.6
New York City	5.4	5.8	5.0	5.1	3.8	4.6	5.5	4.8	4.5	5.5	4.5	5.9	5.0
Oswego	8.8	8.4	7.0	5.5	4.3	5.6	4.6	4.6	5.6	6.9	6.8	8.5	6.4
Rochester	8.8	8.6	7.5	5.7	5.0	5.5	3.7	3.6	5.1	5.9	6.5	7.4	6.1
North Carolina:													
Charlotte	4.3	6.9	4.4	3.5	5.4	4.9	6.4	5.8	4.8	4.7	3.5	4.5	5.1
Hatteras	4.9	5.2	3.8	3.6	3.3	4.5	4.6	4.1	3.2	4.8	3.7	5.9	4.3
Raleigh	4.7	6.7	4.2	4.0	5.3	4.5	5.4	5.1	3.9	4.7	3.6	5.9	4.8
Wilmington	4.6	5.5	3.7	3.2	4.2	4.6	5.1	4.2	3.4	4.8	2.2	5.2	4.2
Ohio:													
Cincinnati	6.3	7.6	6.8	4.5	4.7	5.2	4.0	4.0	5.6	3.9	4.6	7.3	5.3
Cleveland	7.7	7.6	5.6	4.7	4.0	4.0	3.1	3.9	6.2	6.7	6.8	7.7	5.7
Columbus	7.1	7.5	6.9	5.1	4.8	4.4	4.0	3.8	5.4	4.2	4.9	6.9	5.4
Sandusky	7.1	7.6	6.1	4.8	4.1	4.4	3.3	4.4	5.4	5.8	4.9	6.9	5.4
Toledo	6.9	6.9	5.5	5.2	4.1	4.6	2.6	4.3	5.1	5.7	4.1	6.9	5.2
Oregon:													
Astoria[1]	.....	.....	7.5	8.0	6.8	6.8	6.1	7.4	5.0	5.6	6.2	8.0	.....
Portland	8.4	6.5	6.7	6.7	5.5	5.0	3.2	2.9	4.3	4.9	5.9	8.4	5.7
Roseburgh	7.9	7.0	6.4	6.5	4.9	4.1	1.2	1.6	2.9	3.1	6.1	7.9	5.0
Pennsylvania:													
Erie	7.9	7.8	5.6	5.2	4.0	4.8	4.5	4.0	5.8	6.2	6.1	7.9	5.8
Philadelphia	5.4	6.0	5.5	5.6	4.2	5.0	5.5	5.1	5.8	6.0	5.2	6.0	5.4
Pittsburgh	7.6	7.7	6.8	4.9	4.6	3.9	4.3	4.5	5.8	6.2	5.4	6.9	5.7
Rhode Island:													
Block Island	6.2	5.5	5.8	4.6	3.7	3.8	4.6	4.6	4.9	5.9	4.1	5.9	5.0
South Carolina:													
Charleston	4.6	6.2	3.5	3.1	4.9	4.3	5.0	3.9	2.5	4.1	2.6	6.3	4.2
Columbia[2]	.....	.....	.....	.....	.....	4.2	6.1	5.1	4.1	4.5	2.9	6.1	.....
Tennessee:													
Chattanooga	4.4	7.0	4.6	3.7	5.5	4.2	6.0	4.2	4.2	4.0	3.3	7.1	4.9
Knoxville	3.9	6.5	4.8	3.4	4.2	2.7	5.7	4.1	3.6	3.9	3.5	6.7	4.4
Memphis	3.9	6.1	3.7	2.6	4.5	4.5	4.3	3.5	4.8	2.8	3.2	6.3	4.2
Nashville	4.9	6.9	4.7	3.7	4.6	4.1	5.1	3.5	4.8	4.0	3.2	6.7	4.7
Texas:													
Abilene	2.5	5.4	3.0	3.9	5.0	4.2	3.7	4.1	4.3	3.1	3.6	4.4	3.9
Brownsville	3.3	5.1	3.0	3.7	4.1	5.0	2.2	2.5	3.9	5.0	4.9	5.7	4.0
Corpus Christi[3]	.....	6.6	3.2	3.9	3.7	3.9	3.0	3.7	5.0	5.9	5.0	6.1	.....
Davis, Fort	1.7	3.1	1.4	1.7	3.1	2.9	3.5	4.0	4.7	3.3	3.1	2.9	3.0
Elliott, Fort	2.6	3.6	2.4	3.8	3.9	4.0	2.4	3.8	4.1	2.2	2.1	3.4	3.2
El Paso	1.4	2.1	0.8	0.8	1.1	1.5	3.4	4.3	2.8	1.2	1.7	2.0	1.9
Galveston	3.2	5.1	3.3	4.1	4.0	3.5	3.1	3.6	4.1	4.2	3.4	6.6	4.0
Palestine	3.2	6.3	2.8	3.6	4.9	3.8	2.5	4.9	3.7	3.4	3.7	7.2	4.2
Rio Grande City	2.3	5.1	2.3	3.7	3.0	3.5	1.7	2.7	3.8	4.4	5.4	5.1	3.6
San Antonio	3.0	6.7	4.1	5.7	5.1	3.5	3.8	6.0	5.3	4.8	5.3	5.7	4.9
Utah:													
Frisco	2.9	3.9	2.8	4.2	2.8	1.7	3.1	2.4	1.9	1.7	2.5	2.9	2.7
Salt Lake City	6.6	6.3	3.8	4.8	3.1	2.4	3.1	3.2	1.9	1.9	3.1	5.4	3.8
Vermont:													
Northfield[1]	.....	.....	6.2	4.5	3.1	4.4	4.7	3.5	4.6	6.3	6.3	6.5	.....
Virginia:													
Chincoteague[4]	4.3	5.2	5.5	4.9	3.6	[5]4.5	.....	.....	.....	.....	.....	.....	.....
Lynchburgh	4.7	7.1	5.0	5.1	5.1	4.7	5.0	4.7	5.2	4.6	3.7	5.7	5.0
Norfolk	5.4	7.0	5.5	5.1	4.4	4.4	5.0	5.4	4.5	4.9	3.4	5.4	5.0
Washington Territory:													
Canby, Fort	8.7	6.8	8.1	8.3	7.1	7.5	5.4	6.9	4.4	4.9	5.7	7.1	6.7
Olympia	7.9	6.0	6.4	6.1	5.5	5.5	2.8	3.8	4.3	5.4	6.8	8.2	5.7
Port Angeles	7.4	6.6	6.9	6.5	4.7	5.8	3.2	3.1	5.0	5.5	6.7	7.1	5.7
Spokane Falls	5.6	6.7	5.6	6.3	3.7	4.8	2.5	3.9	4.7	4.5	6.2	7.8	5.2
Tatoosh Island	7.9	5.4	7.5	6.6	6.0	6.0	5.4	5.1	5.4	5.5	6.6	8.3	6.3
Walla Walla	7.3	7.1	5.6	6.7	4.1	4.7	1.4	2.5	3.4	3.5	5.5	6.9	4.9
Wisconsin:													
Green Bay	6.0	6.1	4.8	6.5	4.0	5.3	5.0	6.3	5.8	5.9	6.2	8.2	5.8
La Crosse	5.7	6.2	5.6	6.3	4.8	5.6	5.2	6.0	5.3	5.5	5.7	7.5	5.8
Milwaukee	5.8	6.9	5.5	5.3	4.0	4.4	4.0	5.3	5.8	5.6	5.0	7.2	5.4
Wyoming:													
Bridger, Fort	5.4	5.2	4.3	5.8	4.2	4.6	4.4	4.9	3.6	4.1	4.2	5.6	4.7
Cheyenne[6]	.....	.....	3.6	5.3	4.5	3.9	4.7	4.4	3.5	3.7	3.5	4.3	.....

[1] Observations began March, 1887.
[2] Observations began June, 1887.
[3] Observations began February, 1887.
[4] Closed June 30, 1887.
[5] For 18 days.
[6] No observations.

APPENDIX No. 28.

Average number of clear, fair, cloudy, and rainy days at stations of the Signal Service, U. S. Army, for each month of the year (computed from the tri-daily telegraphic observations, from the commencement of observations to December, 1887, inclusive).

[Cloudiness is recorded on a scale of 0 to 10. Clear days are those on which 0 to 3 tenths clouds have been observed; fair, 4 to 7; cloudy, 8 to 10, inclusive; and rainy, those on which .01 inch or more precipitation has fallen.]

Stations.	January.				February.				March.				April.				May.				June.				July.			
	Clear.	Fair.	Cloudy.	Rainy.	Clear.	Fair.	Cloudy.	Rainy.	Clear.	Fair.	Cloudy.	Rainy.	Clear.	Fair.	Cloudy.	Rainy.	Clear.	Fair.	Cloudy.	Rainy.	Clear.	Fair.	Cloudy.	Rainy.	Clear.	Fair.	Cloudy.	Rainy.
Alabama:																												
Mobile	8.2	11.7	11.1	11.2	8.6	11.1	8.5	8.3	12.2	10.5	9.3	10.5	10.4	11.6	8.0	8.6	11.6	13.6	5.8	8.2	9.1	14.4	6.5	12.2	8.1	16.8	6.6	13.1
Montgomery	6.4	11.1	13.5	12.2	7.4	10.2	10.6	10.6	11.5	10.3	9.2	10.9	10.9	10.7	8.4	9.4	11.1	13.9	6.0	9.1	7.5	14.3	8.2	11.9	7.9	16.8	6.7	10.8
Alaska:																												
Sitka	5.4	8.6	17.0	18.7	6.2	8.7	13.3	17.3	5.9	8.1	17.0	20.3	5.7	9.4	14.9	17.7	5.2	10.0	15.8	16.6	6.5	6.9	16.6	13.7	3.6	8.4	19.0	16.0
Arizona:																												
Apache, Fort	15.6	10.3	5.1	6.0	14.4	8.9	4.9	6.9	17.5	8.9	4.6	6.9	17.4	10.0	2.6	4.7	21.7	7.8	1.5	3.0	21.5	6.2	2.3	3.8	10.3	18.9	6.8	13.9
Grant, Fort	17.0	9.0	5.0	5.2	15.2	7.6	5.4	6.0	17.5	9.8	4.2	5.9	21.0	8.0	1.0	2.4	22.2	6.4	2.4	2.3	18.8	9.1	2.1	3.9	9.2	15.7	6.1	13.6
Thomas, Fort[1]	16.5	11.2	3.3	3.4	15.0	9.9	3.3	6.0	17.3	10.3	3.4	4.7	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Whipple Barracks	18.3	10.1	2.6	3.9	17.8	7.3	3.1	4.5	17.7	9.7	3.6	4.9	19.1	8.8	2.1	4.5	23.2	6.8	1.0	2.7	23.7	5.5	0.8	1.5	16.4	11.9	2.7	9.2
Yuma	20.2	8.2	2.6	1.5	18.5	7.3	2.2	1.9	21.2	7.8	2.0	1.1	22.9	6.4	0.7	0.8	26.0	4.2	0.8	0.4	27.0	2.6	0.4	0.8	22.9	7.3	0.8	0.8
Arkansas:																												
Fort Smith	10.8	11.4	8.8	7.6	7.6	10.2	10.4	7.6	10.4	11.4	9.2	8.4	9.8	11.2	9.0	11.6	10.6	13.6	6.8	9.0	11.3	12.5	6.2	10.4	12.8	13.7	4.5	9.0
Little Rock	9.0	10.6	11.4	10.9	8.6	8.7	10.9	10.8	11.2	9.4	10.4	11.0	11.6	11.6	6.8	10.4	10.5	13.9	6.6	11.5	11.9	13.8	4.3	10.5	12.2	13.9	4.9	9.4
California:																												
Bidwell, Fort	6.5	11.5	13.0	15.5	8.5	10.5	9.0	14.0	11.5	10.0	9.5	8.0	10.5	9.0	10.5	10.5	10.0	13.5	7.5	9.5	15.5	11.0	3.5	7.5	22.0	7.3	1.7	4.7
Eureka	5.0	14.0	12.0	19.0	5.0	6.0	17.0	19.0	4.0	14.0	13.0	11.0	4.0	15.0	11.0	13.0	4.0	12.0	15.0	9.0	9.0	14.0	7.0	3.0	6.0	22.0	3.0	0.0
Fresno City[2]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Keeler	21.0	8.0	2.0	3.5	19.5	6.0	2.5	4.0	20.3	10.0	0.7	2.0	18.7	8.3	3.0	4.3	22.4	8.0	0.6	1.0	26.3	3.7	0.0	0.3	25.7	4.6	0.7	2.0
Los Angeles	17.4	8.5	5.1	5.2	13.8	8.9	5.5	6.7	13.0	11.1	6.9	7.2	10.7	12.0	7.3	6.5	12.0	13.3	5.7	3.1	10.1	15.3	4.6	1.6	12.6	17.1	1.8	0.3
Red Bluff	13.5	9.3	8.2	10.1	11.8	8.9	7.5	9.5	14.4	10.0	6.6	8.3	12.4	10.3	7.3	6.0	16.0	10.1	4.9	5.3	22.9	5.5	1.6	2.3	27.7	3.2	0.1	0.5
Sacramento	13.2	10.0	7.8	9.2	12.9	8.8	6.5	9.1	16.1	8.4	6.5	8.9	14.8	10.0	5.2	8.0	21.0	7.4	2.6	2.7	25.2	3.9	0.9	1.3	29.5	1.4	0.1	0.0
San Diego	12.6	11.0	7.4	5.9	10.4	10.7	7.1	7.2	9.1	13.5	8.4	6.5	9.7	12.8	7.5	5.7	7.4	13.3	10.3	3.1	6.5	15.4	8.1	1.3	7.8	17.3	5.9	0.4
San Francisco	11.7	10.1	9.2	11.3	10.1	10.2	8.0	11.1	11.6	11.4	8.0	8.9	11.5	11.9	6.6	7.7	14.1	11.0	5.9	3.4	12.4	11.4	6.2	1.9	8.4	15.3	7.3	0.5
Colorado:																												
Colorado Springs[3]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	6.0	21.0	4.0	18.0
Denver	15.5	12.1	3.4	5.1	13.3	11.7	3.2	5.0	13.0	12.3	5.7	6.7	9.3	12.9	7.8	9.3	9.5	14.6	6.9	10.6	12.5	13.9	3.6	7.9	12.2	14.8	4.0	9.3
Las Animas	12.0	15.2	3.8	5.6	13.7	10.7	3.8	3.3	12.8	14.0	4.2	3.5	8.2	15.3	6.5	6.3	8.5	16.3	6.2	9.2	12.0	14.2	3.8	7.7	14.5	14.5	5.0	9.3
Montrose	8.5	12.5	10.0	9.0	11.5	11.5	5.0	5.5	14.0	11.0	6.0	7.7	7.7	13.7	8.6	13.0	15.3	13.7	2.0	4.3	16.0	13.0	1.0	2.3	15.0	11.7	4.3	8.7
Pike's Peak	14.3	12.0	4.7	9.0	10.5	12.9	4.8	10.2	11.4	12.8	6.8	10.6	8.1	14.4	7.5	16.2	8.4	16.4	5.2	16.6	11.0	16.1	2.9	13.3	7.8	17.8	5.4	18.1

[1] Changed to third order.

[2] Observations began September, 1887.

[3] Observations began July, 1887.

Average number of clear, fair, cloudy, and rainy days at stations of the Signal Service, U. S. Army, for each month of the year—Continued.

Stations.	January.				February.				March.				April.				May.				June.				July.			
	Clear.	Fair.	Cloudy.	Rainy.	Clear.	Fair.	Cloudy.	Rainy.	Clear.	Fair.	Cloudy.	Rainy.	Clear.	Fair.	Cloudy.	Rainy.	Clear.	Fair.	Cloudy.	Rainy.	Clear.	Fair.	Cloudy.	Rainy.	Clear.	Fair.	Cloudy.	Rainy.
Connecticut:																												
New Haven	8.0	12.3	10.7	13.1	8.2	11.1	8.9	12.1	7.7	13.0	10.3	11.8	7.0	12.2	10.8	12.5	9.5	12.8	8.7	10.9	9.3	12.9	7.8	10.2	8.3	14.9	7.8	11.6
New London	8.6	13.7	8.7	13.4	10.1	11.3	6.8	12.4	8.5	13.2	9.8	13.3	8.3	13.8	8.4	11.1	10.2	13.1	7.7	11.4	10.4	13.4	6.2	11.0	8.8	15.1	7.1	11.1
Dakota:																												
Bismarck	10.3	14.3	6.4	8.4	8.6	11.8	7.8	8.6	7.0	13.5	10.5	8.8	7.0	12.2	9.8	9.5	7.8	14.0	9.2	11.8	6.8	16.8	6.4	11.6	10.5	15.9	4.6	10.9
Buford, Fort	7.0	15.9	8.1	8.1	8.2	12.6	7.2	7.8	6.6	15.3	9.1	6.3	8.7	12.9	8.4	7.7	7.2	15.6	8.2	9.5	6.6	15.6	7.8	12.0	8.6	16.1	6.3	10.6
Deadwood	11.9	13.5	5.6	10.6	9.5	13.5	5.2	10.4	9.8	13.6	7.6	12.0	8.4	12.6	9.0	13.6	8.7	14.3	8.0	13.7	10.6	14.7	4.7	13.3	14.6	13.0	3.4	11.5
Huron	9.2	17.5	4.3	6.2	9.7	10.9	7.6	7.5	5.8	16.0	9.2	7.5	8.7	12.2	9.1	11.7	11.2	13.2	6.6	12.0	11.5	14.0	4.5	11.2	10.7	15.9	4.4	11.7
Sully, Fort	7.5	18.5	5.0	8.0	9.0	12.5	6.5	5.7	5.5	15.5	10.0	3.0	8.5	14.0	7.5	7.7	10.0	17.0	4.0	9.0	10.0	17.5	2.5	11.7	12.0	14.5	3.5	11.7
Totten, Fort	12.7	13.0	5.3	8.7	10.7	11.7	5.6	7.7	7.0	16.3	7.7	7.7	9.5	10.0	10.5	6.0	11.0	15.0	5.0	11.3	10.0	13.3	6.7	14.0	10.5	16.8	3.7	11.8
Yankton	10.4	14.9	5.7	7.8	9.5	11.3	7.4	6.7	8.7	13.6	8.7	8.0	9.5	12.5	8.0	9.9	8.9	12.8	9.3	12.3	9.7	14.4	5.9	11.1	10.7	14.4	5.9	9.8
District of Columbia:																												
Washington City	6.2	12.6	12.2	12.2	6.7	12.2	9.3	10.3	7.5	12.9	10.6	11.6	8.4	12.1	9.5	10.8	10.3	12.0	8.7	10.8	8.2	15.1	6.7	10.6	9.1	14.6	7.3	10.7
Florida:																												
Cedar Keys	9.8	14.1	7.1	9.9	14.5	9.1	4.6	5.9	12.4	13.1	5.5	7.8	15.1	10.5	4.4	6.1	12.5	13.5	5.0	6.8	5.9	17.9	6.2	11.5	8.4	14.9	7.7	14.2
Jacksonville	8.6	12.7	9.7	9.4	10.4	10.2	7.6	8.9	12.1	13.0	5.9	7.8	12.7	11.5	5.8	7.2	11.0	14.4	5.6	9.4	7.6	15.2	7.2	13.3	9.1	16.4	5.5	14.1
Key West	11.3	14.3	5.4	8.4	11.9	12.7	3.6	7.1	15.9	12.3	2.8	4.9	13.8	13.5	2.7	5.1	9.3	16.9	4.8	9.1	5.8	17.9	6.3	11.6	5.4	19.9	5.7	14.3
Pensacola	6.8	14.0	10.2	13.5	9.9	10.8	7.5	9.6	12.5	10.6	7.9	9.4	11.4	12.6	6.0	8.0	11.5	13.6	5.9	7.0	10.8	13.7	5.5	13.0	8.5	17.6	4.9	15.5
Sanford[1]	9.5	10.7	10.8	10.5	12.2	11.0	5.0	8.0	12.8	11.7	6.5	11.2	14.4	11.8	3.8	8.0	11.0	16.4	3.6	11.0	6.6	18.0	5.4	19.2	.....	.....	.....	.....
Titusville[2]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	14.0	13.0	4.0	14.0
Georgia:																												
Atlanta	7.6	11.2	12.2	14.4	9.1	9.3	9.6	11.0	11.3	11.7	8.0	11.8	10.9	11.9	7.2	11.2	11.0	13.2	6.8	9.6	7.8	13.6	8.6	11.6	9.8	15.7	5.6	10.2
Augusta	10.8	9.2	11.0	11.8	8.5	11.1	8.4	10.2	12.1	10.5	8.4	10.8	11.3	11.5	7.2	9.0	12.0	13.1	5.9	9.1	8.1	14.7	7.2	11.0	9.4	15.4	6.2	11.6
Savannah	9.1	11.4	10.5	10.5	9.5	10.2	8.5	9.6	11.8	11.3	7.9	9.3	12.2	10.7	7.1	9.2	11.3	13.9	5.8	8.8	7.3	15.7	7.0	12.9	8.4	16.8	5.8	12.2
Idaho:																												
Boisé City	7.1	10.2	13.7	11.8	6.9	10.0	11.3	10.0	10.8	11.8	8.4	8.6	8.7	13.0	8.3	8.2	10.2	15.2	5.6	7.2	12.2	13.5	4.3	6.3	19.0	10.7	1.3	2.0
Illinois:																												
Cairo	6.6	12.1	12.3	12.6	7.5	10.5	10.0	10.1	8.8	11.8	10.4	11.2	8.2	12.4	9.4	10.4	8.4	15.0	7.6	11.6	8.7	14.6	6.7	11.9	11.8	13.3	5.9	9.1
Chicago	7.1	13.2	10.7	12.2	7.7	11.1	9.4	10.8	6.9	13.0	11.1	12.1	7.7	12.9	9.4	11.4	11.2	11.8	8.0	11.3	8.0	14.5	7.5	11.5	12.9	13.5	4.6	9.9
Springfield	8.2	12.4	10.4	10.9	8.2	11.1	8.9	10.8	8.6	12.8	9.6	11.0	8.8	13.0	8.2	11.4	10.1	13.3	7.6	12.2	7.8	14.6	13.0	7.6	13.7	13.8	3.5	8.4
Indiana:																												
Indianapolis	5.4	11.2	14.4	12.4	6.2	9.6	12.4	11.1	6.2	11.5	13.3	13.2	6.9	13.0	10.1	12.0	9.5	12.9	8.6	12.5	7.1	13.7	9.2	12.6	9.9	13.9	7.2	10.5
Indian Territory:																												
Sill, Fort	12.1	11.8	7.1	5.0	11.3	9.2	7.7	5.1	13.7	11.8	5.5	5.6	13.8	11.2	5.0	5.8	12.0	13.0	6.0	9.6	14.0	13.0	3.0	7.6	14.5	12.8	3.7	5.1
Iowa:																												
Davenport	8.6	11.8	10.6	10.2	7.9	10.7	9.6	8.5	7.8	12.9	10.3	9.5	7.2	13.2	9.6	10.1	9.1	13.2	8.7	11.1	7.6	14.7	7.7	12.5	11.0	14.9	5.1	8.6
Des Moines	10.6	11.2	9.2	11.4	8.4	10.9	8.9	10.2	8.2	13.0	9.8	9.2	7.6	10.6	11.8	11.6	8.3	12.6	10.1	11.6	6.2	14.8	9.0	12.7	10.4	14.6	6.0	9.7
Dubuque	7.4	12.6	11.0	10.0	7.5	10.7	10.0	9.5	6.4	13.6	11.0	10.5	7.0	12.5	10.5	10.1	8.2	12.6	10.2	12.2	6.7	13.4	9.9	11.8	10.1	14.7	6.2	9.6
Keokuk	6.5	12.3	12.3	8.8	6.6	11.6	10.0	8.1	5.4	14.5	11.1	10.2	5.6	14.2	10.2	9.6	6.0	15.9	9.1	10.6	5.1	15.4	9.5	11.8	9.1	15.5	6.4	8.7

Kansas:																												
Concordia	13.5	11.5	6.0	7.0	11.5	9.5	7.0	6.0	13.5	11.5	6.0	6.5	11.5	12.5	6.0	9.5	14.0	13.0	4.0	14.5	8.7	18.0	3.3	11.0	14.0	12.0	5.0	8.7
Dodge City	12.9	10.9	7.2	4.8	12.6	9.4	6.2	6.4	13.0	11.8	6.2	5.0	12.7	11.6	5.7	6.6	7.9	14.8	8.3	11.5	11.3	13.7	5.0	9.0	12.3	13.9	4.3	8.3
Leavenworth	9.6	11.6	9.8	7.9	8.8	11.1	8.3	7.9	9.2	13.5	8.3	8.2	8.4	11.0	10.6	10.9	8.1	13.6	9.3	12.4	8.9	15.3	5.8	11.4	12.0	14.3	4.7	8.9
Topeka[3]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	14.0	9.0	7.0	12.0	17.0	14.0	0.0	7.0
Kentucky:																												
Louisville	6.3	10.3	14.4	13.1	6.6	10.6	11.0	10.5	7.2	11.6	12.2	12.1	8.5	11.1	10.4	11.9	10.7	12.5	7.8	10.6	7.1	13.7	9.2	11.8	10.6	14.4	6.0	10.2
Louisiana:																												
New Orleans	8.0	12.7	10.3	11.2	8.6	10.7	8.9	9.2	10.1	11.0	9.9	9.6	10.5	11.2	8.3	7.9	10.2	14.6	6.2	9.8	8.2	16.1	5.7	14.2	7.9	17.6	5.5	15.9
Shreveport	8.5	10.1	12.4	11.6	8.0	10.1	10.1	10.1	9.7	11.7	9.6	10.2	10.2	12.2	7.6	10.0	10.1	14.3	6.6	7.7	9.4	16.0	4.6	8.9	12.0	14.7	4.3	10.0
Maine:																												
Eastport	7.0	12.0	12.0	16.4	6.7	10.9	10.6	13.0	6.0	11.4	13.6	15.3	7.9	9.1	13.0	12.3	7.0	12.1	11.9	12.1	6.2	12.8	11.0	11.7	6.5	14.8	9.7	13.3
Portland	9.1	12.4	9.5	12.9	9.2	11.5	7.5	11.2	7.0	12.4	11.6	12.8	8.3	11.1	10.6	10.5	8.5	12.2	10.3	11.4	8.5	13.5	8.0	11.3	8.5	15.1	7.4	12.3
Maryland:																												
Baltimore	7.2	13.4	10.4	12.6	7.4	12.9	7.9	11.1	8.1	12.3	10.6	12.8	7.9	12.6	9.5	11.2	10.1	12.0	8.9	11.4	7.8	15.1	7.1	10.5	9.3	14.2	7.5	11.6
Massachusetts:																												
Boston	7.9	10.5	12.6	12.8	8.8	9.2	10.2	10.8	8.4	10.3	12.3	18.2	7.7	11.7	10.6	11.6	8.0	14.0	9.0	10.5	8.9	11.8	9.3	11.0	7.8	14.0	9.2	11.1
Nantucket	8.0	11.0	12.0	16.0	6.0	15.0	7.0	14.0	6.0	14.0	11.0	14.0	11.0	11.0	8.0	14.0	14.0	13.0	4.0	6.0	13.0	15.0	2.0	8.0	10.0	18.0	3.0	5.0
Wood's Holl[4]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	11.0	13.0	7.0	7.3	10.7	12.8	6.5	8.9	9.1	13.7	8.2	10.5
Michigan:																												
Alpena	2.4	12.1	16.5	17.2	5.1	10.9	12.2	14.3	6.5	13.0	11.5	14.5	8.7	12.4	8.9	11.5	10.1	13.1	7.7	11.7	10.0	14.0	6.0	11.8	10.9	14.4	5.7	11.3
Detroit	3.9	10.5	16.6	14.1	5.4	11.3	11.5	14.1	5.8	12.5	12.8	14.1	7.0	13.2	9.8	10.4	9.6	13.8	7.6	12.8	9.3	13.3	7.4	11.2	10.3	15.2	5.5	10.4
Escanaba	4.9	13.5	12.6	12.7	5.5	11.7	1.0	10.5	7.9	12.5	10.6	12.0	8.2	12.2	9.6	10.6	8.1	13.6	9.3	13.1	8.0	14.5	7.5	13.6	9.8	15.4	5.8	11.7
Grand Haven	1.6	8.3	21.1	19.8	4.2	10.2	13.8	13.4	5.1	13.3	12.6	13.8	8.0	12.7	9.3	10.6	11.4	12.5	7.1	11.3	9.8	13.9	6.3	9.2	13.6	13.6	3.8	8.6
Lansing	5.0	15.0	11.0	19.0	2.0	11.0	15.0	23.0	10.0	12.0	9.0	8.0	9.0	15.0	6.0	11.0	18.0	9.0	4.0	13.0	9.0	17.0	4.0	13.0	14.0	14.0	3.0	8.0
Mackinaw City	3.6	13.6	13.8	19.2	6.2	10.4	11.6	15.6	9.2	13.4	8.4	11.0	9.2	11.6	9.2	10.2	9.4	14.0	7.6	11.2	9.6	13.2	7.2	10.4	10.6	15.0	5.4	10.6
Marquette	3.8	12.3	14.9	15.3	5.0	11.2	12.0	11.5	7.9	12.6	10.5	12.4	8.9	12.6	8.5	10.2	10.1	12.5	8.4	10.7	9.5	13.1	7.4	11.7	9.8	15.3	6.9	11.7
Port Huron	3.5	12.0	15.5	15.5	4.8	11.4	12.0	13.6	5.5	13.5	12.0	14.4	7.6	12.5	9.9	10.5	9.4	13.2	8.4	11.7	9.5	13.4	7.1	12.2	10.7	15.0	5.3	10.7
Minnesota:																												
Duluth	10.7	11.8	8.5	10.6	8.0	11.0	9.2	10.3	11.0	11.0	9.0	10.0	9.5	11.5	9.0	10.4	9.6	12.1	9.3	12.4	7.7	13.7	8.6	15.4	9.6	15.6	5.8	12.6
Moorhead	10.0	15.5	5.5	8.6	7.6	12.2	8.4	9.1	6.0	16.0	9.0	7.7	7.9	13.3	8.8	10.4	9.4	13.2	8.4	9.3	9.4	13.2	7.4	8.6	8.3	17.1	5.6	9.3
Saint Paul	8.1	13.9	9.0	9.7	8.4	11.0	8.8	8.5	8.3	12.8	9.9	9.9	7.7	11.9	10.4	10.1	9.1	14.5	7.4	10.6	8.0	15.5	6.5	12.4	9.8	16.6	4.6	10.5
Saint Vincent	12.0	14.6	4.4	8.9	8.7	14.0	5.5	8.9	9.4	14.2	7.4	7.1	10.1	11.3	8.6	7.9	10.3	15.3	5.4	8.6	9.3	15.1	5.6	9.7	10.1	16.5	4.4	11.0
Mississippi:																												
Vicksburg	7.1	10.9	13.0	12.2	7.9	9.6	10.7	10.9	10.6	10.7	9.7	10.3	10.9	11.9	7.2	9.9	12.3	12.3	6.4	7.9	9.9	15.2	4.9	10.1	10.2	15.4	5.4	9.7
University[2]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	15.0	8.0	7.0	7.0	12.0	14.0	5.0	17.0
Missouri:																												
Lamar	11.5	9.0	10.5	8.5	9.0	14.0	5.0	7.0	8.7	14.0	8.3	9.0	7.7	15.7	6.6	9.7	11.3	12.7	7.0	9.7	9.0	14.3	6.7	9.7	17.7	9.3	4.0	7.3
Saint Louis	9.3	11.4	10.3	9.1	8.5	10.5	9.2	9.1	8.4	11.5	11.1	11.3	8.9	11.9	9.2	10.4	9.8	12.5	8.7	12.2	8.2	14.5	7.3	11.5	11.8	13.4	5.8	9.6
Montana:																												
Assinaboine, Fort	6.4	15.3	9.3	10.0	7.6	12.6	8.0	7.3	10.3	13.3	7.4	6.4	9.0	15.4	5.6	6.1	9.0	17.1	4.9	6.3	9.6	14.8	5.6	8.4	13.3	14.0	2.7	6.0
Custer, Fort	7.4	14.5	9.1	8.1	4.8	16.0	7.4	6.8	7.1	16.2	7.7	6.6	5.7	16.4	7.8	7.0	6.6	17.7	6.7	9.6	7.7	16.7	5.6	9.1	10.1	17.2	3.7	7.3
Helena	3.6	15.0	12.4	12.3	5.0	14.5	8.7	9.0	10.0	14.9	6.1	7.7	6.9	14.2	8.9	8.7	7.4	17.0	6.6	7.9	8.1	16.0	5.9	10.9	14.1	14.4	2.5	5.4
Maginnis, Fort	5.0	12.6	13.4	13.6	5.4	13.4	9.4	11.6	8.6	11.8	10.6	12.2	7.0	13.0	10.0	10.4	8.4	16.2	6.4	10.4	7.0	15.4	7.6	13.0	10.6	16.0	4.4	9.8
Poplar River	11.5	12.7	6.8	8.8	11.0	10.0	7.2	7.0	7.7	16.5	6.8	7.0	12.4	11.8	5.8	6.8	15.7	12.5	2.8	8.0	12.0	15.0	3.0	10.2	13.8	15.0	2.2	5.8
Nebraska:																												
Crete[5]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	5.0	11.0	4.0	5.0
North Platte	11.9	14.3	4.8	5.2	11.2	11.7	5.3	4.5	9.2	14.5	7.3	6.2	8.5	15.3	6.2	8.9	7.2	15.2	8.6	10.9	8.9	17.3	3.8	9.6	10.2	16.9	3.9	9.6
Omaha	9.8	12.6	8.6	7.1	9.7	10.6	7.9	6.9	9.0	12.9	9.1	7.3	8.4	11.0	10.6	10.3	8.1	11.6	11.3	11.9	8.2	13.7	8.1	11.5	11.1	14.1	5.8	9.9
Valentine	7.0	18.0	6.0	7.0	11.5	8.5	8.0	5.5	9.5	13.5	8.0	4.5	7.0	13.5	9.5	10.0	11.0	15.0	5.0	10.0	7.5	16.5	6.0	11.5	11.0	17.0	3.0	10.5

[1] Closed June 30, 1887.
[2] Opened July 1, 1887.
[3] Observations began June, 1887.
[4] Observations began in May, 1887.
[5] Observations began July, 1887.

Average number of clear, fair, cloudy, and rainy days at stations of the Signal Service, U. S. Army, for each month of the year—Continued.

Stations.	January.				February.				March.				April.				May.				June.				July.			
	Clear.	Fair.	Cloudy.	Rainy.	Clear.	Fair.	Cloudy.	Rainy.	Clear.	Fair.	Cloudy.	Rainy.	Clear.	Fair.	Cloudy.	Rainy.	Clear.	Fair.	Cloudy.	Rainy.	Clear.	Fair.	Cloudy.	Rainy.	Clear.	Fair.	Cloudy.	Rainy.
Nevada:																												
Winnemucca	11.7	12.2	7.1	7.5	10.5	10.4	7.3	9.5	14.4	11.0	5.6	7.1	11.7	11.9	6.4	7.6	14.1	12.6	4.3	4.4	16.5	11.4	2.1	4.9	24.5	6.2	0.7	1.1
New Hampshire:																												
Manchester[1]	.....	.....	.....	.....	.....	.....	.....	.....	6.0	15.0	10.0	9.0	12.0	9.0	9.0	12.0	12.0	13.0	6.0	6.0	8.0	12.0	10.0	10.0	5.0	16.0	10.0	16.0
Mount Washington	6.1	11.6	13.3	16.7	7.5	9.6	11.1	13.5	7.2	10.8	13.0	17.7	7.6	9.8	12.6	14.4	8.4	12.5	10.1	16.7	6.9	11.9	11.2	15.8	6.7	12.9	11.4	17.2
New Jersey:																												
Atlantic City	8.0	11.9	11.1	13.6	8.4	11.2	8.4	10.9	9.1	12.9	9.0	13.7	9.6	11.1	9.4	11.8	9.8	13.7	7.5	10.9	10.9	12.7	6.4	9.0	10.9	14.0	6.1	9.6
New Mexico:																												
Santa Fé	19.5	11.0	4.1	5.7	12.3	11.9	4.0	6.4	13.9	13.0	4.1	5.3	11.8	14.5	3.7	5.9	12.7	15.1	3.3	6.4	13.8	14.1	2.1	6.4	8.0	17.9	5.1	13.5
Stanton, Fort	21.5	7.5	2.0	2.7	19.0	7.0	2.0	2.7	22.0	7.5	1.5	3.3	22.0	7.0	1.0	3.0	20.0	10.0	1.0	5.0	19.0	9.0	2.0	10.3	15.5	12.5	3.0	11.7
New York:																												
Albany	5.5	12.8	12.7	12.6	7.0	10.8	10.4	12.2	6.0	13.3	11.7	13.7	7.8	11.6	10.6	12.1	9.4	13.3	8.3	12.0	9.0	12.7	8.3	12.2	9.1	14.9	7.0	12.4
Buffalo	1.3	9.2	20.5	18.2	4.2	10.2	13.6	15.6	5.1	12.1	13.8	17.0	6.8	11.8	11.4	12.3	9.3	12.5	9.2	11.6	8.7	13.3	8.0	11.8	9.6	15.4	6.0	10.9
New York City	7.7	12.1	11.2	11.8	8.1	10.9	9.2	10.9	7.5	13.8	9.7	11.6	8.2	12.4	9.4	11.1	9.5	13.1	8.4	9.8	8.5	14.7	6.8	10.6	8.3	15.3	7.4	11.4
Oswego	1.1	6.8	23.1	16.7	3.0	8.2	7.0	13.7	3.9	10.9	16.2	14.4	7.1	10.8	12.1	11.7	9.3	12.4	9.3	11.0	8.7	12.5	8.8	10.6	9.5	14.6	6.9	9.9
Rochester	1.2	8.4	21.4	19.9	2.8	10.5	14.9	16.5	3.8	11.1	16.1	17.3	7.0	11.1	11.9	12.6	8.6	13.2	9.2	11.4	8.1	12.7	9.2	11.7	8.9	14.9	7.2	11.5
North Carolina:																												
Charlotte	7.0	11.1	12.9	14.1	8.7	9.2	10.3	10.9	9.3	13.1	8.6	11.7	9.5	12.2	8.3	10.6	8.9	13.8	8.3	11.2	8.0	13.5	8.5	12.3	7.3	16.0	7.7	12.2
Hatteras	7.1	13.2	10.7	16.3	9.5	11.0	7.7	10.1	10.6	11.8	8.6	12.1	9.9	13.1	7.0	10.6	11.4	13.2	6.4	9.6	8.8	15.2	6.0	11.3	10.0	14.9	6.1	10.9
Raleigh	11.0	12.0	8.0	10.0	5.0	11.0	12.0	15.0	13.0	11.0	7.0	10.0	15.0	8.0	7.0	8.0	5.0	19.0	7.0	11.0	10.0	13.0	7.0	11.0	10.0	12.0	9.0	13.0
Wilmington	8.5	11.2	11.3	12.5	9.1	8.5	10.6	10.9	11.5	10.1	9.4	11.1	11.9	10.8	7.3	9.5	10.6	13.3	7.1	9.8	9.1	12.9	8.0	11.3	9.4	14.5	7.1	12.8
Ohio:																												
Cincinnati	5.6	9.9	15.5	13.5	5.7	10.2	12.3	11.1	6.2	12.4	12.4	12.2	8.3	12.1	9.6	11.9	9.1	13.6	8.3	11.3	7.2	13.5	9.3	12.2	10.1	13.4	7.5	11.1
Cleveland	3.1	9.3	18.6	16.8	4.2	12.1	11.9	14.1	4.8	12.6	13.6	15.6	7.5	13.1	9.4	12.8	10.5	12.8	7.7	14.6	10.1	13.3	6.6	11.9	10.8	15.4	4.8	11.5
Columbus	4.2	11.1	15.7	16.8	4.7	10.6	12.9	13.1	4.6	12.4	14.0	14.6	9.4	10.3	10.3	12.4	11.0	13.0	7.0	12.5	9.0	13.6	7.4	12.1	10.0	16.0	5.0	10.7
Sandusky	5.1	10.6	15.3	15.2	4.9	10.7	12.6	14.2	5.7	13.0	12.3	13.1	7.1	13.2	9.7	12.0	10.8	12.8	7.4	11.8	9.9	13.9	6.2	12.4	11.2	14.7	5.1	9.2
Toledo	3.8	11.5	16.7	13.8	4.4	11.9	11.9	11.5	6.0	10.8	14.2	12.8	6.4	13.3	10.3	11.8	9.5	12.8	8.7	11.4	7.9	14.4	7.7	10.9	10.1	15.2	5.7	10.0
Oregon:																												
Astoria[1]	.....	.....	.....	.....	.....	.....	.....	.....	3.0	11.0	17.0	23.0	1.0	8.0	21.0	21.0	6.0	10.0	15.0	12.0	3.0	13.0	14.0	8.0	7.0	12.0	12.0	5.0
Portland	3.7	7.6	19.7	20.1	3.0	6.8	18.4	17.1	5.8	7.9	17.3	17.5	6.0	9.6	14.4	14.2	6.1	10.0	14.9	13.1	7.1	9.9	13.0	9.9	14.8	7.8	8.4	4.2
Roseburgh	3.1	10.3	17.6	17.9	3.7	9.5	15.0	16.0	7.4	11.0	12.6	13.5	5.5	11.6	12.9	13.2	9.0	11.3	10.7	10.8	10.8	10.4	8.8	6.5	17.6	9.0	3.5	2.9
Pennsylvania:																												
Erie	2.1	9.7	19.2	19.7	4.0	10.6	13.6	17.1	4.9	11.9	14.2	17.8	7.4	13.3	9.3	13.1	10.9	12.5	7.6	11.7	10.2	13.0	6.8	12.1	10.4	15.4	5.2	10.3
Philadelphia	6.6	12.5	11.9	12.1	7.5	11.0	9.7	11.0	7.4	12.1	11.5	11.9	7.7	12.2	10.1	10.9	10.5	11.8	8.7	10.4	9.0	13.6	7.4	9.6	9.5	13.9	7.6	11.1
Pittsburgh	3.7	11.9	15.4	16.2	4.4	11.8	12.0	14.6	4.4	13.7	12.9	14.9	7.4	12.9	9.7	12.8	9.7	13.5	7.8	11.8	8.0	15.8	6.2	12.0	8.4	16.8	5.8	12.9
Rhode Island:																												
Block Island	7.7	14.0	9.3	15.0	8.6	14.2	5.4	12.9	8.9	14.7	7.4	11.9	11.3	11.6	7.1	10.4	10.3	14.0	6.7	11.1	12.2	13.1	4.7	9.7	12.0	14.7	4.3	9.4
South Carolina:																												
Charleston	9.2	11.4	10.4	11.9	11.0	9.3	7.9	9.8	12.3	11.0	7.0	10.0	12.3	11.4	6.3	8.0	11.4	14.0	5.6	8.4	8.6	14.1	7.3	10.6	9.3	15.7	6.0	11.1
Columbia[2]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	10.0	12.0	4.0	9.0	2.0	20.0	9.0	19.0

Tennessee:																												
Chattanooga	6.6	10.0	14.4	16.9	7.7	9.3	11.2	13.3	10.4	10.0	10.6	12.7	10.1	12.2	7.7	10.8	11.3	13.8	5.9	10.4	9.4	14.9	5.7	12.8	10.0	16.0	5.0	13.3
Knoxville	6.6	10.4	14.0	14.3	7.5	9.2	11.5	11.8	9.0	11.4	10.6	12.9	10.1	10.7	9.2	11.7	11.1	13.9	6.0	11.7	8.4	14.6	7.0	12.9	9.9	14.8	6.3	12.6
Memphis	7.8	9.9	13.3	12.5	8.6	8.4	11.2	11.0	10.1	10.4	10.5	12.2	10.8	10.5	8.7	11.2	10.4	13.9	6.7	10.6	8.7	15.4	5.9	10.5	11.6	14.2	5.2	9.2
Nashville	5.6	10.9	14.5	12.8	6.2	10.0	12.0	11.1	8.1	11.5	11.4	12.2	7.8	12.6	9.6	11.1	9.0	14.7	7.3	10.3	6.4	16.9	6.7	11.8	8.7	16.2	6.1	10.9
Texas:																												
Abilene	17.0	10.5	3.5	3.5	13.0	8.0	7.0	4.0	15.0	12.0	4.0	4.5	14.0	12.5	3.5	6.0	14.5	13.0	3.5	5.5	13.0	14.5	2.5	6.5	14.5	14.0	2.5	6.0
Brownsville	8.8	10.4	11.8	9.3	7.5	9.1	11.4	6.8	7.8	10.4	12.8	6.4	6.7	14.0	9.3	3.0	9.4	14.9	6.7	6.2	13.0	13.4	3.6	6.0	14.7	13.7	2.6	5.5
Corpus Christi[3]	.....	.....	.....	.....	1.0	19.0	8.0	3.0	15.0	14.0	2.0	4.0	10.0	17.0	3.0	0.0	15.0	13.0	3.0	6.0	11.0	17.0	2.0	10.0	16.0	15.0	0.0	3.0
Davis, Fort	18.8	8.9	3.3	3.0	15.5	9.4	3.3	2.9	17.6	9.5	3.9	3.0	19.8	8.0	2.2	2.8	16.4	11.9	2.7	5.0	15.9	11.8	2.3	8.6	16.1	12.0	2.9	9.0
Elliott, Fort	17.6	8.0	5.4	2.8	14.5	8.2	5.5	3.0	14.4	12.4	4.2	4.4	15.4	9.6	5.0	5.0	11.6	13.2	6.2	9.0	13.8	12.1	4.1	8.0	13.4	12.4	5.2	6.8
El Paso	17.4	10.6	3.0	3.4	17.2	8.0	3.0	3.8	19.6	8.5	2.9	2.9	20.8	7.8	1.4	1.3	21.6	7.7	1.7	2.3	19.5	9.7	0.8	3.9	10.7	17.4	2.9	9.2
Galveston	8.8	10.0	12.2	11.4	8.1	10.5	9.6	10.0	8.6	12.5	9.9	8.9	9.9	10.8	9.3	6.8	9.6	14.9	6.5	7.0	12.1	13.7	4.2	8.0	11.7	16.2	3.1	9.6
Palestine	11.2	12.8	7.0	9.8	8.6	9.6	10.0	10.0	10.2	11.0	9.8	9.4	9.3	13.7	7.0	9.8	9.7	14.9	6.5	9.5	10.7	15.6	3.7	6.8	14.0	14.2	2.8	7.4
Rio Grande City	11.6	9.5	9.9	5.3	10.5	9.5	8.2	3.6	11.0	11.0	9.0	4.6	12.7	11.5	5.8	3.2	10.5	15.2	5.3	7.7	14.1	11.9	4.0	4.4	17.2	9.8	4.0	3.9
San Antonio	10.9	9.1	11.0	7.6	8.8	8.0	11.4	7.1	9.9	9.6	11.5	6.3	8.4	10.8	10.8	6.3	6.5	15.1	9.4	6.6	7.7	17.6	4.7	5.6	9.3	15.1	6.6	6.3
Utah:																												
Frisco	15.5	9.0	6.5	4.0	12.5	12.5	3.0	5.5	17.5	6.0	7.5	4.5	10.5	13.5	6.0	5.0	20.5	9.5	1.0	1.0	23.0	7.0	0.0	1.0	18.0	13.3	1.7	6.0
Salt Lake City	7.9	11.5	11.6	11.2	7.4	10.5	10.3	8.9	10.9	11.0	9.1	9.1	7.4	13.2	9.4	10.0	11.0	13.4	6.6	6.7	15.2	12.0	2.8	4.3	16.3	12.4	2.3	3.6
Vermont:																												
Northfield[1]	.....	.....	.....	.....	.....	.....	.....	.....	5.0	13.0	13.0	18.0	11.0	11.0	8.0	13.0	19.0	6.0	6.0	8.0	13.0	19.0	7.0	10.0	11.0	12.0	8.0	18.0
Virginia:																												
Chincoteague[4]	6.9	14.4	9.7	15.8	7.0	14.7	6.5	12.6	9.3	13.1	8.6	13.4	9.1	13.3	7.6	12.0	10.2	13.0	7.8	11.1	8.4	16.0	5.6	10.2	....	.....	.....	.....
Lynchburgh	8.7	11.7	10.6	11.7	8.6	11.4	8.2	10.6	11.0	11.4	8.6	11.1	9.8	11.9	8.4	11.2	11.9	11.6	7.5	10.8	9.3	12.1	8.6	12.1	10.3	14.2	6.5	11.0
Norfolk	8.5	11.8	10.7	12.6	8.5	11.0	8.7	10.7	9.8	11.3	9.9	11.6	9.7	10.7	9.6	10.9	10.5	12.6	7.9	10.8	9.5	12.8	7.7	10.4	9.2	14.1	7.7	12.4
Washington Territory:																												
Canby, Fort	6.5	11.0	13.5	19.8	8.2	8.5	11.5	16.0	5.7	12.5	12.8	15.0	5.4	12.3	12.3	16.5	4.8	12.2	14.0	12.2	1.7	11.8	16.5	11.8	5.8	12.0	13.2	8.5
Olympia	2.1	9.3	19.6	20.5	3.5	7.8	16.9	18.4	6.1	10.3	14.6	16.7	5.6	11.7	12.7	15.3	7.3	10.8	12.9	12.9	6.3	11.5	12.2	8.3	11.5	12.9	6.6	5.1
Port Angeles	2.0	12.5	16.5	22.0	2.[illegible]	10.7	14.6	17.3	8.3	11.7	11.0	14.0	8.3	13.7	8.0	11.0	9.3	11.4	10.3	9.7	6.3	16.4	7.3	7.7	16.4	9.3	5.3	3.7
Spokane Falls	5.7	12.8	12.5	14.3	7.3	9.6	11.3	13.9	11.9	11.7	7.4	8.9	9.9	12.6	7.5	10.1	11.6	13.0	6.4	8.1	9.0	13.9	7.1	9.6	15.4	11.4	4.2	4.6
Tatoosh Island	3.5	9.0	18.5	21.8	5.0	7.7	15.5	20.0	6.0	12.5	12.5	16.8	6.5	11.2	12.3	14.2	6.2	12.5	12.3	14.2	3.2	14.8	12.0	11.2	6.2	15.2	9.6	7.5
Walla Walla	3.0	14.0	14.0	17.0	5.5	10.5	2.0	12.5	7.5	13.0	10.5	9.5	5.5	13.5	11.0	10.5	13.5	11.0	6.5	6.0	9.5	12.0	8.5	10.0	22.0	7.0	2.0	1.0
Wisconsin:																												
Green Bay	5.0	16.0	10.0	15.0	7.0	8.0	13.0	15.0	7.0	19.0	5.0	4.0	4.0	11.0	15.0	10.0	13.0	11.0	7.0	9.0	8.0	13.0	9.0	13.0	9.0	14.0	8.0	8.0
La Crosse	8.7	13.3	9.0	11.5	7.9	11.7	8.6	9.0	8.5	12.8	9.7	9.4	9.0	11.6	9.4	10.1	10.0	12.5	8.5	11.3	8.7	14.2	7.1	11.9	10.5	14.7	5.8	10.9
Milwaukee	5.5	14.7	10.8	14.9	5.9	12.1	10.2	9.9	6.7	13.5	10.8	12.0	6.6	13.6	9.8	10.7	9.5	13.2	8.3	11.1	7.2	16.3	6.5	12.0	10.1	16.5	4.4	10.7
Wyoming:																												
Bridger, Fort	9.0	12.5	9.5	8.3	10.5	12.0	5.5	8.0	9.5	17.5	4.0	6.0	4.0	17.5	8.5	11.7	10.0	18.0	3.0	9.3	9.5	17.0	3.5	8.0	9.5	18.5	3.0	9.5
Cheyenne	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	12.0	13.3	5.7	6.1	8.7	13.8	7.5	9.3	8.1	14.3	8.6	11.1	11.4	13.7	4.9	8.4	12.7	13.8	4.5	10.4

[1] Observations began March, 1887.
[2] Observations began June, 1887.
[3] Observations began February, 1887.
[4] Closed June 30, 1887.
[5] No observations.

Average number of clear, fair, cloudy, and rainy days at stations of the Signal Service, U. S. Army, for each month of the year—Continued.

Stations.	August.				September.				October.				November.				December.				Annual.			
	Clear.	Fair.	Cloudy.	Rainy.	Clear.	Fair.	Cloudy.	Rainy.	Clear.	Fair.	Cloudy.	Rainy.	Clear.	Fair.	Cloudy.	Rainy.	Clear.	Fair.	Cloudy.	Rainy.	Clear.	Fair.	Cloudy.	Rainy.
Alabama:																								
Mobile	8.9	15.6	6.5	12.0	12.2	11.8	6.5	8.9	14.1	10.2	6.7	6.8	11.8	10.2	8.0	7.4	9.5	11.7	9.8	10.4	148.6	125.2	91.4	116.2
Montgomery	8.7	16.1	6.2	10.9	11.6	11.8	7.1	6.9	14.0	8.9	8.1	6.3	11.7	9.4	8.9	8.6	8.8	10.1	12.1	12.1	119.7	142.6	103.6	119.8
Alaska:																								
Sitka[1]	6.1	9.5	15.4	16.1	6.2	7.8	16.0	20.4	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Arizona:																								
Apache, Fort	9.4	16.0	5.6	14.9	17.6	9.1	3.3	5.7	22.1	7.2	1.7	4.4	20.6	6.7	2.7	4.0	17.9	8.5	4.6	6.1	205.7	114.7	44.1	81.1
Grant, Fort	9.4	16.4	5.2	13.5	19.8	7.9	2.3	5.7	23.1	5.9	2.0	3.6	19.5	7.4	3.1	2.7	18.2	7.6	5.2	5.3	210.3	111.3	43.3	70.7
Thomas, Fort	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Whipple Barracks	14.6	13.7	2.7	11.6	23.8	5.0	1.2	3.5	24.0	5.9	1.1	3.2	22.3	6.4	1.3	2.2	20.1	8.4	2.5	3.5	234.9	103.1	27.2	61.9
Yuma	21.1	7.8	2.1	2.0	26.4	3.2	0.4	0.6	24.8	5.7	0.5	0.5	22.6	6.2	1.2	0.9	22.3	6.9	1.8	1.8	277.4	73.0	14.8	12.6
Arkansas:																								
Fort Smith	13.7	12.2	5.1	7.7	14.0	9.8	6.2	6.3	13.5	10.3	7.2	6.8	12.5	10.7	6.8	7.2	10.0	11.2	9.8	7.2	137.0	136.2	93.2	97.6
Little Rock	15.4	12.0	3.6	8.7	14.0	10.4	5.6	6.8	14.5	11.2	5.3	6.9	13.7	8.6	7.7	9.3	10.7	9.4	10.9	10.2	145.0	133.0	87.0	117.6
California:																								
Bidwell, Fort	24.0	6.5	4.5	1.5	23.5	5.5	1.0	1.0	16.7	11.0	3.3	4.7	11.0	8.3	10.7	11.3	7.3	11.7	12.0	14.0	172.0	114.0	79.0	97.0
Eureka	6.0	19.0	6.0	0.0	13.0	14.0	3.0	1.0	15.0	15.0	1.0	3.0	5.0	14.0	11.0	7.0	2.0	11.0	18.0	18.0	78.0	170.0	117.0	103.0
Fresno City [2]	.....	.....	.....	.....	28.0	1.0	1.0	2.0	27.0	2.0	2.0	1.0	23.0	7.0	0.0	4.0	14.0	12.0	5.0	6.0	.....	.....	.....	.....
Keeler	26.7	3.3	1.0	1.0	28.0	2.0	0.0	0.7	25.0	5.0	1.0	1.3	20.7	8.0	1.3	3.0	19.1	9.3	2.0	2.3	272.5	78.0	14.5	22.5
Los Angeles	16.5	13.4	1.1	0.1	17.1	11.6	1.3	0.1	18.2	10.5	2.3	2.2	18.9	8.6	2.5	2.5	17.9	8.6	4.5	5.3	176.7	150.3	48.2	41.5
Red Bluff	28.7	2.2	0.1	0.3	25.4	3.9	0.7	1.6	26.6	9.9	3.5	3.9	18.0	6.7	5.3	6.6	11.9	9.8	9.3	10.0	223.3	86.7	55.2	67.6
Sacramento	29.8	1.2	0.0	0.0	26.1	3.5	0.4	1.2	23.4	5.9	1.7	3.4	19.3	6.2	4.5	5.0	13.1	8.6	9.3	9.2	243.6	76.2	45.4	68.7
San Diego	9.6	17.4	4.0	0.8	11.1	15.2	3.7	0.5	18.3	12.9	4.8	2.2	14.1	10.2	5.7	2.8	13.7	10.9	6.4	4.8	125.2	160.4	79.4	41.6
San Francisco	9.1	15.0	6.9	0.4	13.4	12.4	4.3	1.2	15.2	11.6	4.2	3.6	14.4	9.8	5.8	6.6	12.8	9.4	8.8	10.1	146.2	139.9	79.1	66.4
Colorado:																								
Colorado Springs	11.0	14.0	6.0	13.0	14.0	12.0	4.0	6.0	14.0	12.0	5.0	6.0	15.0	11.0	4.0	4.0	15.0	13.0	3.0	5.0	.....	.....	.....	.....
Denver	11.7	14.7	4.6	10.1	16.6	9.8	3.6	5.8	15.7	10.9	4.4	5.0	15.5	10.3	4.2	5.3	14.6	13.6	2.8	5.4	159.3	151.6	54.1	85.4
Las Animas	12.2	14.2	4.6	7.8	16.5	10.2	3.3	4.5	16.0	11.0	4.0	4.4	17.3	10.2	2.5	2.5	11.8	14.7	4.5	3.8	149.2	161.8	54.2	70.4
Montrose	13.7	12.3	4.0	10.7	19.3	9.0	1.7	6.0	19.7	9.3	2.0	5.0	15.7	7.0	7.3	6.7	13.3	10.3	7.4	7.0	180.0	134.0	51.0	77.0
Pike's Peak	7.6	18.1	5.3	18.2	14.1	12.8	3.1	9.5	15.8	11.6	3.6	9.2	14.8	10.5	4.7	8.8	12.8	13.7	4.5	9.5	136.9	168.9	59.4	149.3
Connecticut:																								
New Haven	10.3	13.3	7.4	9.0	10.9	10.6	8.5	8.2	10.9	11.9	8.2	9.1	10.1	11.5	8.4	9.9	8.1	12.6	10.3	10.9	108.2	149.1	107.9	130.4
New London	9.8	13.6	7.6	10.8	11.2	10.9	7.9	9.2	10.7	12.6	7.7	10.5	10.1	11.2	8.7	11.2	9.1	12.8	9.1	13.2	116.6	153.6	94.8	139.8
Dakota:																								
Bismarck	12.6	13.9	4.5	8.3	12.2	13.1	4.7	6.4	10.7	12.1	8.2	7.4	8.3	12.9	8.8	7.9	8.4	15.0	7.6	9.9	111.1	165.6	81.6	99.0
Buford, Fort	12.8	13.1	5.1	7.3	11.0	14.7	4.3	4.0	8.1	14.0	8.9	7.3	6.1	16.2	7.7	7.6	7.0	16.6	7.4	7.3	97.6	175.8	87.0	95.0
Deadwood	15.6	11.8	3.6	9.0	18.2	8.8	3.0	4.8	15.5	10.9	4.8	8.6	14.2	10.3	5.5	8.5	10.7	14.0	6.3	11.4	149.2	151.8	63.6	132.2
Huron	11.6	14.6	4.8	12.0	11.4	14.0	4.6	7.6	11.3	11.7	8.0	8.6	12.1	11.7	6.2	6.1	9.7	14.9	6.4	7.9	123.7	166.7	74.8	94.1
Sully, Fort	14.0	12.0	5.0	10.3	14.5	11.0	4.0	4.8	18.0	9.0	4.0	5.5	14.0	12.0	4.0	7.0	6.3	17.7	7.0	7.3	130.5	171.0	63.5	130.5
Totten, Fort	11.8	16.2	3.0	9.8	10.8	15.5	3.7	6.2	10.2	12.8	8.0	8.2	10.8	10.8	8.4	6.2	8.5	16.0	6.5	9.8	123.7	166.0	65.0	106.0

Yankton	12.5	13.1	5.4	8.7	12.4	11.9	5.7	8.1	13.1	12.1	6.8	6.1	11.1	12.5	6.4	5.2	9.4	13.4	8.2	7.9	125.9	156.9	82.4	102.9
District of Columbia:																								
Washington City	9.3	13.6	8.1	11.5	10.7	11.3	8.0	8.1	11.7	11.2	8.1	8.6	9.0	11.9	9.1	9.9	7.7	12.9	10.4	11.0	104.7	152.5	107.9	126.0
Florida:																								
Cedar Keys	9.9	14.9	6.2	12.5	12.9	13.5	3.6	5.6	16.9	9.1	5.0	7.1	14.6	10.8	4.6	5.8	12.4	12.4	6.2	8.3	144.1	153.4	66.8	103.8
Jacksonville	9.2	16.6	5.2	14.2	9.2	12.6	8.2	13.8	11.7	11.4	7.9	9.8	10.8	10.9	8.3	7.8	10.2	12.3	8.5	7.5	122.9	156.9	85.4	123.2
Key West	4.6	21.1	5.3	14.8	3.8	19.8	6.4	16.6	7.6	16.2	7.3	13.0	9.9	14.5	5.6	8.2	10.4	15.8	4.8	7.9	110.0	194.9	60.1	120.8
Pensacola	9.8	15.6	5.6	13.0	12.2	12.4	5.4	9.5	14.4	10.1	6.5	6.5	11.6	10.6	7.8	8.7	9.1	11.2	9.7	10.8	128.1	152.5	84.5	124.1
Sanford	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Titusville	19.0	11.0	1.0	11.0	12.0	10.0	8.0	18.0	7.0	13.0	11.0	13.0	9.0	19.0	2.0	11.0	6.0	16.0	9.0	13.0	.....	.....	.....	.....
Georgia:																								
Atlanta	8.6	15.1	7.3	12.2	12.6	11.8	5.7	7.9	13.8	9.5	7.7	7.9	11.1	10.8	8.1	10.1	9.0	11.9	10.1	12.4	121.7	147.6	96.0	141.0
Augusta	8.3	15.4	7.3	12.1	10.5	12.6	6.9	7.4	15.4	9.4	6.2	7.2	11.3	10.5	8.2	8.9	17.1	11.1	9.8	10.4	127.4	144.2	92.9	119.1
Savannah	7.7	15.2	8.1	13.1	9.2	12.1	8.7	10.8	12.7	11.5	6.8	7.8	10.9	11.5	7.6	7.1	10.5	11.1	9.4	9.3	120.9	151.0	93.3	120.0
Idaho:																								
Boisé City	22.0	7.8	1.2	1.5	18.1	8.3	3.6	2.8	13.4	10.8	6.8	7.8	10.9	11.1	8.0	6.2	7.3	9.7	14.0	12.5	145.0	130.6	88.9	89.1
Illinois:																								
Cairo	14.3	13.2	3.5	7.5	13.0	11.2	5.8	6.9	14.0	10.5	6.5	7.7	9.5	10.0	10.5	9.8	7.2	10.9	12.9	11.2	117.8	145.2	101.9	120.4
Chicago	12.2	13.9	4.9	9.8	11.1	12.0	6.9	9.6	10.0	11.8	9.2	10.4	7.1	10.4	12.5	11.1	6.5	11.5	13.0	12.8	108.3	149.3	106.8	136.3
Springfield	12.2	15.7	3.1	7.6	13.1	11.6	5.3	8.2	12.2	12.0	6.8	9.6	10.0	12.0	8.0	8.8	6.6	12.3	12.1	11.1	120.1	154.1	91.0	122.4
Indiana:																								
Indianapolis	11.5	13.6	5.9	9.8	11.1	12.0	6.9	8.3	10.6	12.1	8.3	9.7	6.9	10.3	12.8	11.1	5.5	9.9	15.6	13.9	96.4	144.0	125.5	138.1
Indian Territory:																								
Sill, Fort	16.3	12.1	2.6	7.2	14.1	11.3	4.6	6.0	15.9	10.3	4.8	5.9	13.1	10.5	6.4	4.7	12.3	10.4	8.3	6.1	166.3	135.4	63.4	74.2
Iowa:																								
Davenport	11.7	13.4	6.0	9.4	10.4	12.8	6.8	9.1	10.6	11.2	9.2	8.8	8.7	11.1	11.2	8.5	6.4	12.9	11.7	10.2	106.1	152.5	106.5	117.7
Des Moines	11.3	12.2	7.5	9.7	10.0	12.3	7.7	10.5	11.1	12.5	7.4	9.8	11.0	11.1	7.9	7.5	7.0	13.3	10.7	10.9	108.9	149.0	107.3	124.8
Dubuque	9.9	14.2	6.9	9.7	8.9	12.9	8.2	10.5	8.7	12.0	10.3	8.9	6.3	11.9	11.8	8.5	6.2	11.6	13.2	11.1	94.0	152.8	118.2	123.1
Keokuk	9.9	15.3	5.8	7.4	10.4	12.2	7.4	8.6	9.9	12.2	8.9	8.1	6.8	11.4	11.8	7.2	6.2	11.9	12.9	9.4	88.3	162.4	114.3	110.0
Kansas:																								
Concordia	11.3	15.7	4.0	8.0	15.3	9.4	5.3	8.0	16.0	12.3	2.7	3.7	13.3	10.7	6.0	4.3	14.7	9.3	7.0	8.7	164.5	141.0	59.5	80.5
Dodge City	14.2	12.8	4.0	7.1	15.2	10.8	4.0	4.4	17.1	8.5	5.4	5.4	14.8	10.4	4.8	3.1	13.6	11.6	5.8	4.5	157.8	140.8	66.0	76.2
Leavenworth	13.3	13.1	4.6	8.2	12.8	11.2	6.0	7.8	13.1	11.7	6.2	8.1	10.9	11.9	7.2	6.3	9.4	11.9	9.7	7.5	124.1	150.4	90.8	105.4
Topeka	7.0	17.0	7.0	12.0	11.0	11.0	8.0	11.0	20.0	8.0	3.0	7.0	13.0	11.0	6.0	6.0	13.0	9.0	9.0	9.0	.....	.....	.....	.....
Kentucky:																								
Louisville	11.8	13.9	5.3	8.6	11.2	12.0	6.8	8.0	12.7	11.7	6.6	6.7	7.9	10.2	11.9	10.2	6.2	9.9	14.9	12.4	106.3	142.1	116.8	121.2
Louisiana:																								
New Orleans	8.5	18.3	4.2	13.8	10.7	12.9	6.4	10.8	13.6	11.5	5.9	7.4	10.7	10.1	9.2	9.4	8.1	11.5	11.4	12.0	115.1	157.9	92.1	130.1
Shreveport	13.8	14.5	2.7	6.4	14.4	9.8	5.8	7.6	15.1	10.5	5.4	6.9	11.2	10.2	8.6	9.0	10.1	9.3	11.6	10.7	132.5	143.8	88.9	106.8
Maine:																								
Eastport	9.8	11.8	9.4	9.7	9.1	11.2	9.7	11.1	7.9	12.0	11.1	11.3	5.7	11.6	12.7	12.3	6.2	11.5	13.3	14.3	88.1	143.3	133.7	153.1
Portland	11.2	13.1	6.7	10.0	10.8	11.3	7.9	7.8	9.0	11.9	10.1	10.2	8.9	11.0	10.1	11.0	8.4	13.1	9.5	11.8	105.1	150.7	109.3	137.9
Maryland:																								
Baltimore	9.8	12.7	8.5	12.1	10.5	12.2	7.3	9.0	11.4	11.9	7.7	9.5	9.9	11.2	8.9	10.1	7.9	13.5	9.6	11.1	107.5	153.8	103.9	132.9
Massachusetts:																								
Boston	10.8	12.1	8.1	10.8	10.8	10.4	8.8	9.2	10.0	11.6	9.4	10.0	9.0	10.4	10.6	11.1	7.2	11.5	12.3	12.1	105.8	136.7	122.5	133.6
Nantucket	18.0	8.0	5.0	11.0	10.0	11.0	9.0	10.0	8.0	12.0	11.0	12.0	8.5	13.0	8.5	11.0	4.5	12.0	14.5	15.5	116.0	154.0	95.0	133.0
Wood's Holl	10.8	11.9	8.3	7.8	10.1	11.3	8.6	6.6	10.3	12.0	8.7	6.6	8.1	9.9	12.0	10.9	7.4	12.3	11.3	10.0	.....	.....	.....	.....
Michigan:																								
Alpena	11.1	13.9	6.0	10.7	8.9	12.3	8.8	13.2	6.3	11.1	13.6	15.3	2.0	10.9	17.1	16.3	1.4	8.9	20.7	18.0	83.4	145.7	135.7	166.6
Detroit	11.6	12.8	6.6	10.5	9.8	12.8	7.4	10.1	8.8	11.6	10.6	10.9	4.9	10.6	14.5	13.3	2.5	11.6	16.9	15.8	88.6	149.3	127.1	148.8

[1]Closed October 1, 1887.

[2]Observations began September, 1887.

Average number of clear, fair, cloudy, and rainy days at stations of the Signal Service, U. S. Army, for each month of the year—Continued.

Stations.	August.				September.				October.				November.				December.				Annual.			
	Clear.	Fair.	Cloudy.	Rainy.	Clear.	Fair.	Cloudy.	Rainy.	Clear.	Fair.	Cloudy.	Rainy.	Clear.	Fair.	Cloudy.	Rainy.	Clear.	Fair.	Cloudy.	Rainy.	Clear.	Fair.	Cloudy.	Rainy.
Michigan—Continued.																								
Escanaba	9.9	13.4	7.7	12.3	7.7	14.2	8.1	12.8	5.8	11.3	13.9	2.0	3.9	11.2	14.9	14.0	3.6	11.8	15.6	13.5	81.9	155.2	127.9	151.9
Grand Haven	13.0	13.4	4.6	9.1	10.1	12.7	7.2	10.8	7.8	10.9	12.3	12.8	3.2	9.2	17.6	14.6	1.5	7.5	22.0	17.6	89.2	137.6	138.2	151.6
Lansing	11.0	16.0	4.0	9.0	8.0	17.0	5.0	11.0	8.0	10.0	13.0	15.0	7.0	10.0	13.0	9.0	1.0	10.0	20.0	16.0	102.0	156.0	107.0	155.0
Mackinaw City	12.6	12.0	6.4	10.0	9.0	14.7	6.8	12.2	5.8	12.5	12.7	14.4	2.3	9.5	18.2	16.5	0.5	8.0	22.5	19.4	88.2	147.6	129.4	160.4
Marquette	10.3	13.6	7.1	11.8	7.2	12.6	10.2	12.2	5.4	11.5	14.1	14.6	2.3	9.6	18.1	15.2	2.4	9.4	19.2	15.2	82.1	146.9	136.0	153.9
Port Huron	10.2	14.2	6.6	10.5	8.6	14.3	7.1	10.7	6.2	13.0	11.8	12.0	3.9	11.4	14.7	12.7	2.1	10.6	18.3	15.9	81.1	155.5	128.7	150.9
Minnesota:																								
Duluth	9.9	13.7	7.4	13.4	7.7	13.4	8.9	13.5	7.3	10.5	13.2	11.1	6.1	11.1	12.8	12.1	7.5	11.5	12.0	12.6	104.6	146.7	113.7	143.5
Moorhead	9.9	16.3	4.8	7.6	9.4	15.0	5.6	7.3	8.2	12.9	9.9	8.7	6.3	14.4	9.3	8.3	6.4	16.0	8.6	11.1	99.0	174.9	91.3	106.0
Saint Paul	10.1	14.8	6.1	10.3	8.8	13.9	7.3	10.4	10.3	12.3	8.4	8.5	6.8	13.4	9.8	9.1	8.2	12.9	9.9	11.4	103.4	163.7	97.9	121.0
Saint Vincent	11.4	15.0	4.6	8.1	11.1	13.1	5.8	7.6	7.7	11.5	11.8	8.9	6.6	14.6	8.8	8.1	9.8	15.9	5.3	8.6	118.7	169.3	77.1	102.7
Mississippi:																								
Vicksburg	11.5	15.7	3.8	8.4	12.3	10.9	6.8	7.3	15.0	9.5	6.5	6.5	10.4	10.8	8.8	9.9	8.6	10.0	12.4	11.4	126.0	142.8	96.2	106.7
University	18.0	10.0	3.0	5.0	14.0	10.0	6.0	4.0	18.0	6.0	7.0	4.0	17.0	5.0	8.0	3.0	3.0	13.0	15.0	15.0	.....	.....	.....	.....
Missouri:																								
Lamar	12.0	15.0	4.0	7.3	10.0	13.0	7.0	10.0	18.0	9.3	9.7	6.7	14.4	10.3	5.3	4.0	12.7	10.7	7.6	8.3	153.8	139.8	71.5	91.5
Saint Louis	13.5	13.9	3.6	7.8	13.4	11.2	5.4	6.9	13.7	11.4	5.9	7.7	8.8	11.6	9.6	9.2	7.3	11.1	12.6	10.5	121.7	144.6	98.8	115.4
Montana:																								
Assinaboine, Fort	15.0	12.6	3.4	6.2	12.2	12.4	5.4	5.8	10.2	13.2	7.6	6.4	8.0	14.8	7.2	5.8	7.8	15.0	8.2	7.4	121.8	172.4	71.0	82.2
Custer, Fort	15.0	13.7	2.3	5.4	14.3	11.5	4.2	5.3	10.4	12.5	8.1	7.2	8.0	16.2	5.8	5.7	6.1	14.3	10.6	8.3	102.0	182.6	78.6	85.9
Helena	17.4	11.4	2.2	4.9	14.9	11.2	3.1	5.4	10.6	14.9	5.5	5.2	9.0	15.2	5.8	6.0	6.6	15.9	8.5	5.0	111.0	177.3	76.7	78.9
Maginnis, Fort	14.0	11.7	5.3	7.8	12.3	10.8	6.9	7.5	10.2	13.5	7.3	8.2	7.5	14.2	8.3	7.8	6.5	13.0	11.5	11.3	161.6	102.0	101.6	123.6
Poplar River	16.7	11.3	3.0	6.5	14.2	13.2	3.6	4.0	12.6	12.0	5.4	6.2	11.5	13.3	5.2	4.7	9.6	15.0	6.4	7.8	135.2	165.8	64.2	83.2
Nebraska:																								
Crete	9.0	14.0	8.0	12.0	8.0	12.0	10.0	9.0	13.0	12.0	6.0	1.0	16.0	8.0	6.0	4.0	7.0	15.0	9.0	6.0	.....	.....	.....	.....
North Platte	12.8	14.8	3.4	8.7	13.8	12.6	3.6	5.2	13.0	13.0	5.0	5.9	11.9	13.8	4.3	4.0	10.8	13.6	6.6	5.9	129.8	172.1	68.3	82.2
Omaha	11.9	12.7	6.4	8.4	12.6	10.8	6.6	8.5	13.1	10.7	7.2	7.0	11.1	10.8	8.1	5.0	9.1	12.7	9.2	7.3	122.1	144.2	98.9	101.2
Valentine	11.0	13.5	6.5	9.5	15.0	9.3	5.7	6.3	14.7	10.0	6.3	4.7	11.0	11.7	7.3	3.7	6.7	15.9	8.4	6.0	126.4	159.7	79.0	91.0
Nevada:																								
Winnemucca	25.4	4.9	0.7	1.2	23.1	4.8	2.1	1.9	19.3	9.2	2.5	4.0	14.9	11.0	4.1	5.7	12.1	11.9	7.0	7.7	197.3	118.0	49.8	65.4
New Hampshire:																								
Manchester	10.0	16.0	5.0	12.0	11.0	15.0	4.0	8.0	9.0	15.0	7.0	6.0	13.0	9.0	8.0	9.0	7.0	15.0	9.0	13.0	.....	.....	.....	.....
Mount Washington [1]	8.1	13.8	9.1	14.1	8.8	10.7	10.5	14.2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
New Jersey:																								
Atlantic City	11.1	11.4	8.5	10.4	11.7	10.9	7.4	7.9	12.8	10.0	8.2	10.1	10.1	10.8	9.1	10.4	9.4	12.0	9.6	11.5	121.6	142.8	100.9	129.9
New Mexico:																								
Santa Fé	7.8	18.2	5.0	12.2	15.2	12.4	2.4	7.2	19.5	9.5	2.0	4.1	16.3	10.2	3.5	9.4	16.2	10.3	4.5	5.2	164.7	158.5	41.9	82.2
Stanton, Fort	12.5	16.5	2.0	11.3	17.0	8.0	5.0	9.7	23.0	4.5	3.5	3.3	19.7	9.0	1.0	3.7	20.0	10.3	0.7	4.0	227.0	112.0	26.0	69.5

New York:																								
Albany	11.5	13.0	6.5	9.4	9.6	12.2	8.2	10.0	7.8	12.4	10.8	10.3	4.5	11.4	14.1	12.9	3.6	11.9	15.5	14.0	90.9	150.3	124.0	144.9
Buffalo	10.9	13.5	6.6	9.6	9.1	12.3	8.6	11.4	7.4	11.2	12.4	18.9	2.7	8.9	18.4	16.0	0.9	8.5	21.6	18.4	77.1	138.3	149.7	169.4
New York City	10.1	12.8	8.1	9.8	10.0	11.8	8.2	9.0	10.5	12.4	8.1	9.3	9.0	11.5	9.5	10.1	6.3	13.3	11.4	11.2	103.5	154.1	107.6	126.2
Oswego	9.6	13.8	7.6	8.0	7.5	12.0	10.5	10.5	5.4	10.3	15.3	14.1	1.5	6.6	21.9	16.6	0.8	5.6	24.6	16.8	67.5	124.4	173.4	148.2
Rochester	10.4	13.4	7.2	10.0	8.4	12.8	8.8	11.1	6.6	11.1	13.3	15.0	2.5	9.2	18.3	16.0	1.0	6.9	23.1	18.8	69.6	134.1	161.6	171.1
North Carolina:																								
Charlotte	8.1	13.3	9.6	11.0	10.0	12.3	7.7	6.6	13.6	9.0	8.4	8.0	12.8	8.6	8.6	9.2	8.9	12.4	9.7	12.1	111.0	145.7	108.6	130.4
Hatteras	9.6	12.3	9.1	13.9	11.9	12.0	6.1	6.6	11.9	12.1	7.0	6.6	11.0	12.4	6.6	9.1	7.7	13.4	9.9	13.3	119.3	154.9	91.0	131.3
Raleigh	9.0	12.0	10.0	16.0	14.0	11.0	5.0	6.0	15.0	4.0	12.0	11.0	14.0	4.0	12.0	8.0	5.0	12.0	14.0	11.0	126.0	137.0	102.0	130.0
Wilmington	8.5	13.6	8.9	14.5	9.8	11.7	8.5	9.6	14.1	9.6	7.3	7.7	12.0	9.5	8.5	7.9	10.4	11.5	9.1	11.1	124.6	137.2	108.4	128.7
Ohio:																								
Cincinnati	11.5	12.8	6.7	10.2	10.9	11.1	8.0	8.9	11.6	11.5	7.9	9.2	7.2	11.3	11.5	10.8	5.7	10.9	14.4	13.8	98.9	142.9	123.9	140.6
Cleveland	12.3	13.1	5.6	10.0	9.6	11.9	8.5	11.4	8.1	10.9	12.0	12.7	3.5	9.8	17.2	14.3	2.3	10.0	18.7	17.4	86.8	143.7	134.8	161.0
Columbus	12.2	12.7	6.1	11.3	10.2	13.6	6.2	10.2	10.4	12.2	8.4	10.1	6.9	11.8	11.3	11.2	4.0	10.7	16.3	16.2	97.0	148.7	119.6	150.3
Sandusky	11.2	13.5	6.3	10.0	10.7	12.9	6.4	10.5	9.4	10.7	10.9	11.5	4.9	11.8	13.3	13.5	3.0	10.4	17.6	16.1	93.9	148.0	123.1	150.6
Toledo	11.5	13.1	6.4	9.5	10.6	12.0	7.4	9.6	8.8	11.7	10.5	10.5	5.1	11.4	13.5	12.1	3.3	10.8	16.9	14.4	87.1	148.9	129.0	136.5
Oregon:																								
Astoria	4.0	8.0	19.0	6.0	9.0	10.0	11.0	11.0	7.0	11.0	4.0	13.0	6.0	9.0	15.0	16.0	4.0	3.0	24.0	24.0	.....	.....	.....	.....
Portland	15.9	8.6	6.5	4.3	12.1	10.1	7.8	8.1	8.1	10.2	12.7	13.3	5.8	9.5	15.1	16.7	3.9	7.9	19.2	19.2	92.3	106.1	166.6	156.5
Roseburg	20.8	8.5	1.7	1.6	16.3	8.9	4.8	4.6	8.7	13.2	9.1	12.0	4.6	13.3	12.1	12.7	2.2	11.1	17.7	17.7	109.9	128.8	126.5	126.3
Pennsylvania:																								
Erie	11.3	13.9	5.8	9.9	9.1	12.5	8.4	12.1	7.4	9.9	13.7	15.4	2.3	9.0	18.7	16.9	1.7	6.6	22.7	20.5	82.5	137.9	144.8	177.4
Philadelphia	10.5	10.8	9.7	10.6	11.3	10.5	8.2	8.9	11.5	11.3	8.2	8.4	9.3	10.8	9.9	9.8	6.3	13.1	11.6	10.1	106.9	143.7	114.6	118.1
Pittsburgh	9.8	15.2	6.0	9.4	9.1	13.8	7.1	9.9	8.6	13.4	9.0	9.7	5.4	11.2	13.4	12.3	2.6	12.2	16.2	14.9	80.7	162.8	121.8	153.6
Rhode Island:																								
Block Island	11.0	15.6	4.4	9.0	11.1	12.9	6.0	7.9	10.6	11.5	8.9	10.5	9.1	12.8	8.1	11.2	6.6	14.2	10.2	13.2	116.3	165.9	83.0	132.3
South Carolina:																								
Charleston	9.2	14.2	7.6	12.8	10.9	10.9	8.2	10.6	14.1	10.5	6.4	7.7	12.2	10.6	7.2	7.9	11.2	10.8	9.0	9.9	131.5	143.5	89.2	117.4
Columbia	11.0	11.0	9.0	12.0	13.0	14.0	3.0	5.0	16.0	6.0	9.0	11.0	16.0	11.0	3.0	4.0	6.0	11.0	14.0	11.0	.....	.....	.....	.....
Tennessee:																								
Chattanooga	8.4	16.5	6.1	11.6	11.2	13.0	5.8	9.1	12.9	10.6	7.5	7.9	11.6	9.7	9.7	9.0	7.8	10.8	12.4	12.7	117.3	146.7	100.8	138.4
Knoxville	10.3	14.6	6.1	11.3	13.5	10.1	6.4	7.5	15.3	8.5	7.2	8.1	9.4	10.4	10.2	9.8	8.0	11.1	11.9	12.2	118.2	139.6	107.2	129.3
Memphis	13.4	12.5	5.1	7.9	12.8	10.4	6.8	7.5	14.8	10.3	5.9	7.4	10.7	8.9	10.4	10.5	7.9	10.8	12.3	11.5	129.0	134.2	101.8	122.0
Nashville	11.1	15.2	4.7	8.6	11.5	12.1	6.4	8.0	7.1	10.8	7.1	7.1	9.2	10.4	10.4	10.2	5.7	11.3	14.0	12.1	101.4	151.3	112.3	127.8
Texas:																								
Abilene	15.5	11.0	4.5	6.5	12.0	13.0	5.0	6.5	19.7	8.0	3.3	5.5	15.3	10.3	4.4	5.5	17.0	8.0	6.0	7.0	179.0	135.0	51.0	61.5
Brownsville	12.7	14.4	3.9	7.5	11.2	13.2	5.6	10.3	12.9	10.5	5.6	7.5	9.1	11.8	9.1	6.8	8.9	12.3	9.8	7.4	124.9	149.0	90.5	82.9
Corpus Christi	14.0	13.0	4.0	4.0	11.0	12.0	7.0	19.0	10.0	7.0	14.0	10.0	12.0	8.0	10.0	4.0	9.0	6.0	15.0	14.0	.....	.....	.....	.....
Davis Fort	15.2	11.6	4.2	10.2	15.6	10.4	4.0	8.4	18.1	9.1	3.8	4.4	16.0	7.4	6.6	3.3	18.4	8.8	3.3	2.3	204.2	115.8	43.2	60.2
Elliott, Fort	15.9	10.8	4.3	7.6	16.3	9.3	4.4	5.9	17.2	8.0	5.8	6.4	17.8	8.0	4.2	2.5	18.7	9.8	6.5	3.3	183.4	120.3	61.8	64.0
El Paso	15.1	13.1	2.8	9.0	20.1	7.3	2.6	5.1	21.9	7.7	1.4	4.7	19.2	8.0	2.8	3.2	20.2	8.2	2.6	3.6	219.5	176.0	29.6	53.2
Galveston	13.2	13.5	4.3	9.9	12.5	11.8	5.9	10.5	14.7	10.5	5.8	7.6	11.1	11.0	7.9	9.4	9.4	10.2	11.4	11.8	129.2	146.4	89.6	111.8
Palestine	13.2	15.3	2.5	6.5	13.3	11.2	5.5	8.0	14.0	11.2	4.8	7.4	12.7	10.0	7.3	8.2	9.2	11.5	10.3	9.4	146.2	141.5	77.5	96.8
Rio Grande City	14.3	12.1	4.6	6.4	13.5	12.3	4.2	6.5	13.7	11.1	6.2	5.4	11.4	9.9	8.7	4.3	11.4	11.1	6.5	5.7	159.7	136.7	68.7	48.1
San Antonio	8.3	17.7	5.0	6.1	10.6	12.7	6.8	8.3	12.6	10.8	7.7	7.0	10.3	10.2	9.5	6.7	10.8	9.4	10.8	7.6	113.4	149.0	102.6	87.0
Utah:																								
Frisco	14.3	12.7	4.0	9.0	25.0	4.3	0.7	1.0	24.3	6.0	0.7	3.0	17.0	9.3	3.7	5.3	15.3	12.3	3.3	4.7	220.0	108.5	36.5	51.0
Salt Lake City	15.7	12.2	3.1	5.1	18.0	9.3	2.7	3.6	13.9	11.4	5.7	6.5	11.0	10.7	8.3	7.8	8.2	10.8	12.0	9.7	144.6	136.8	83.8	85.4
Vermont:																								
Northfield	17.0	10.0	4.0	12.0	11.0	12.0	7.0	11.0	4.0	14.0	13.0	16.0	5.0	11.0	14.0	12.0	5.0	15.0	11.0	15.0	.....	.....	.....	.....

[1] Closed October 1, 1887.

Average number of clear, fair, cloudy, and rainy days at stations of the Signal Service, U. S. Army, for each month of the year—Continued.

Stations.	August.				September.				October.				November.				December.				Annual.			
	Clear.	Fair.	Cloudy.	Rainy.	Clear.	Fair.	Cloudy.	Rainy.	Clear.	Fair.	Cloudy.	Rainy.	Clear.	Fair.	Cloudy.	Rainy.	Clear.	Fair.	Cloudy.	Rainy.	Clear.	Fair.	Cloudy.	Rainy.
Virginia:																								
Chincoteague	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Lynchburgh	9.8	12.9	8.3	11.8	12.0	11.1	6.9	8.4	15.4	9.2	6.4	6.7	11.2	11.9	6.9	9.1	10.0	11.6	9.4	10.1	128.3	141.3	95.6	124.3
Norfolk	9.0	13.5	8.5	12.7	11.1	11.0	7.9	8.7	13.9	9.9	7.2	8.5	11.4	10.3	8.3	9.8	9.7	11.9	9.4	10.6	120.8	140.8	104.1	130.5
Washington Territory:																								
Canby, Fort	8.5	12.0	10.8	4.2	10.8	10.8	8.4	13.6	10.8	11.4	8.8	16.2	7.8	7.4	14.8	19.4	4.2	9.8	17.0	22.6	81.2	130.8	152.8	174.5
Olympia	12.5	12.9	5.6	4.5	7.7	12.2	10.1	9.5	5.5	11.7	13.8	15.6	2.5	10.6	16.9	15.9	2.0	8.4	20.6	21.8	74.1	128.9	162.2	164.0
Port Angeles	17.3	12.0	1.7	2.7	11.3	10.7	8.0	9.3	8.3	15.3	7.4	13.3	2.3	14.0	13.7	16.3	2.3	15.0	13.7	22.0	82.0	161.0	122.0	149.0
Spokane Falls	21.1	7.9	2.0	2.6	14.4	10.3	5.3	8.0	9.6	11.7	9.7	11.3	5.9	12.9	11.2	13.1	4.5	10.9	15.6	16.7	134.8	136.3	94.0	118.2
Tatoosh Island	11.5	12.8	6.7	6.0	6.2	13.0	10.8	13.8	8.2	11.8	11.0	16.0	3.6	8.6	17.8	21.0	2.6	8.0	20.4	23.4	68.5	134.5	162.2	186.0
Walla-Walla	24.5	5.0	1.5	2.5	18.5	9.5	2.0	4.5	13.5	13.5	3.0	11.5	8.5	14.0	7.5	8.0	3.3	13.7	14.0	16.0	135.5	136.0	93.5	108.0
Wisconsin:																								
Green Bay	3.0	18.0	10.0	8.0	5.0	15.0	10.0	15.0	7.5	14.0	9.5	10.5	5.5	13.5	11.0	10.0	4.5	10.5	16.0	17.0	74.0	165.0	126.0	137.0
La Crosse	10.5	14.3	6.2	9.8	10.5	12.2	7.3	11.5	9.5	12.1	9.4	9.5	6.4	11.2	12.4	9.1	7.8	12.0	11.2	10.6	107.3	153.2	104.5	125.0
Milwaukee	9.9	15.1	6.0	9.2	8.5	14.1	7.4	10.9	7.3	13.2	10.5	10.1	5.2	12.1	12.7	10.4	4.9	12.8	13.3	13.2	87.1	167.2	110.8	133.8
Wyoming:																								
Bridger, Fort	11.3	14.0	5.7	9.7	18.7	8.7	2.6	3.7	13.3	14.7	3.0	6.0	12.5	12.0	5.5	7.5	6.7	17.3	6.0	7.0	117.5	187.0	60.5	89.0
Cheyenne	12.0	14.6	4.4	10.4	16.0	10.4	3.6	5.2	14.8	11.4	4.8	5.4	13.4	12.2	4.4	4.8	12.8	13.6	4.6	4.8	.....	.....	.....	.....

APPENDIX No. 29.

Dates of the first and last killing frost, at regular and voluntary stations of the Signal Service, U. S. Army, for the season, of 1887–'88.

States and stations.	Dates of— First.	Dates of— Last.
Alabama:		
Bermuda	Oct. 31	Mar. 13
Florence	Oct. 22	Mar. 8
Gadsden	Oct. 13	Apr. 13
Mobile [1]	Oct. 31	Jan. 29
Montgomery [1]	Oct. 31	Mar. 23
Tuscumbia	Oct. 12	Apr. 25
Arkansas:		
Conway	Oct. 12	Mar. 21
Fort Smith [1]	Nov. 19	Mar. 29
Jersey	Nov. 8	Apr. 28
Lead Hill	Oct. 12	(2)
Little Rock [1]	Nov. 20	Mar. 22
Washington	Oct. 14	Mar. 29
Arizona:		
Apache, Fort [1]	Oct. 20	(3)
Cedar Springs	(2)	Apr. 29
Grant, Fort [1]	Nov. 27	Mar. 28
Holbrook	Oct. 15	May 27
Teviston	(2)	Mar. 28
Tucson	Nov. 21	Mar. 20
Whipple Barracks [1]	Oct. 9	May 28
Yuma [1]	Dec. 22	Jan. 12
California:		
Bidwell, Fort [1]	Sept. 1	June 30
Eureka [1]	Jan. 6	Mar. 27
Fresno City [1]	Nov. 26	Mar. 1
Keeler [1]	Nov. 27	Mar. 1
Los Angeles [1]	Nov. 30	Jan. 16
Oroville	Nov. 25	Jan. 17
Red Bluff [1]	Nov. 21	Mar. 4
Sacramento [1]	Nov. 25	Feb. 29
San Diego [1]	(4)	(4)
San Francisco [1]	Dec. 31	Jan. 11
Santa Barbara	Jan. 7	Jan. 9
Willows	Nov. 20	Apr. 1
Colorado:		
Climax	(5)	(5)
Colorado Springs [1]	Oct. 20	Apr. 30
Denver [1]	Sept. 28	May 12
Grand Junction	Oct. 17	Apr. 10
Husted	Sept. 13	May 29
Las Animas [1]	Oct. 20	Apr. 29
Longmont	Sept. 14	Apr. 12
Monte Vista	Sept. 27	June 23
Montrose [1]	Oct. 19	May 28
Pike's Peak [1]	(5)	(5)
Saguache	Oct. 16	May 29
Walden	Sept. 28	June 28
Connecticut:		
Middleton	Sept. 24	May 17
New Haven [1]	Sept. 27	May 17
New London [1]	Oct. 16	May 3
Southington	Oct. 12	May 17
Dakota:		
Bismarck [1]	Sept. 15	June 6
Buford [1]	Sept. 15	May 16
Dakota—Continued.		
Deadwood [1]	Oct. 9	(3)
Garden City	Sept. 15	May 14
Highmore	Sept. 15	(2)
Huron [1]	Sept. 23	May 16
Rapid City [1]	(1)	May 18
Sully, Fort [1]	Oct. 9	Apr. 7
Totten, Fort [1]	Sept. 15	June 1
Woonsocket	Sept. 19	May 16
Yankton [1]	Oct. 11	May 12
District of Columbia:		
Washington City [1]	Oct. 16	Apr. 26
Florida:		
Archer	Oct. 31	Mar. 23
Cedar Keys [1]	Nov. 21	Mar. 12
Duke	Dec. 19	Feb. 27
Fort Meade	Dec. 19	Dec. 19
Homeland	(4)	(4)
Jacksonville [1]	Nov. 21	Feb. 29
Key West [1]	(4)	(4)
Manatee	(4)	(4)
Pensacola [1]	Nov. 21	Feb 28
Sanford [1]	(4)	(4)
Titusville [1]	(4)	(4)
Georgia:		
Athens	Nov. 6	Apr. 26
Atlanta [1]	Oct. 31	Mar. 23
Augusta [1]	Nov. 1	Mar. 16
Forsyth	Nov. 21	(3)
Savannah [1]	Nov. 20	Mar. 23
Idaho:		
Boisé City [1]	Oct. 23	May 11
Illinois:		
Aledo	Oct. 25	Apr. 24
Atwood	Oct. 5	May 15
Beason	Sept. 24	May 14
Cairo [1]	Oct. 30	Mar. 30
Chicago [1]	Oct. 11	May 15
Eberle	Oct. 12	Apr. 14
Fairfield	Oct. 12	May 15
Golconda	Oct. 12	May 15
Greenville	Oct. 12	Apr. 29
Griggsville	Oct. 12	Apr. 25
Irishtown	Oct. 25	Mar. 22
Lake Forest	Sept. 24	May 1
Mascoutah	Nov. 20	Apr. 20
Mattoon	Sept. 24	Apr. 23
Melvin	Oct. 25	(2)
Olney	Sept. 23	May 15
Oswego	Oct. 5	Apr. 25
Ottawa	Oct. 5	May 13
Paris	Sept. 24	Apr. 20
Pekin	Oct. 5	May 14
Peoria	Oct. 25	Mar. 28
Pontiac	Sept. 16	May 19
Richview	Oct. 12	Mar. 29
Riley	Oct. 5	May 13

[1] Used to designate regular stations of the Signal Service.
[2] No record.
[3] Station closed before last frost was to be expected.
[4] No frost during the season.
[5] Frost every month.

Dates of the first and last killing frost, at regular and voluntary stations of the Signal Service, U. S. Army, etc.—Continued.

States and stations.	Dates of— First.	Dates of— Last.
Illinois—Continued.		
Rockford	Oct. 5	Apr. 30
Sandwich	Nov. 28	(2)
South Evanston	Oct. 5	May 16
Springfield [1]	Oct. 12	May [illegible]
Sumner	Oct. 12	Apr. 24
Wateeka	Oct. 12	May 13
Windsor	Sept. 24	June 1
Woodstock	Sept. 24	May 13
Indiana:		
Blue Lick	Oct. 25	Mar. 28
Columbia City	Sept. 24	May 14
Columbus	Sept. 24	May 15
Connersville	Sept. 21	May 15
Farmland	Sept. 24	May 20
Indianapolis [1]	Oct. 12	Apr. 3
Jeffersonville	Oct. 12	May 15
Mount Vernon	Sept. 24	Apr. 25
Rockville	Sept. 23	May 15
Salem	Sept. 24	May 20
Summan	Oct. 22	Apr. 21
Indian Territory:		
Sill, Fort [1]	Oct. 27	Mar. 29
Iowa:		
Ames	(2)	May 19
Bancroft	Sept. 23	June 2
Cedar Rapids	Sept. 24	May 19
Clarinda	Oct. 10	May 15
Davenport [1]	Oct. 12	May 13
Des Moines [1]	Oct. 12	Apr. 20
Dubuque [1]	Oct. 5	May 19
Elkader	Sept. 23	May 19
Glenwood	Oct. 3	May 14
Keokuk [1]	Oct. 12	Apr. 20
Monticello	Sept. 24	May 13
Muscatine	Oct. 5	May 16
Osceola	(2)	June 1
Oskaloosa	Oct. 11	May 14
Kansas:		
Allison	(2)	Apr. 29
Belleville	Oct. 10	Apr. 20
Cawker City	Oct. 11	Apr. 30
Concordia [1]	Oct. 21	Mar. 28
Dodge City [1]	Oct. 21	Apr. 30
El Dorado	Oct. 11	Apr. 30
Englewood	Oct. 23	Apr. 30
Globe	Oct. 24	Apr. 20
Leavenworth [1]	Oct. 12	Apr. 20
Manhattan	Oct. 11	May 19
Morse	Sept. 20	Apr. 30
Nebo	Oct. 12	May 19
Rome	Oct. 25	Apr. 30
Salina	Oct. 11	May 14
Sedan	Nov. 19	Mar. 29
Topeka [1]	Oct. 12	May 19
Wakefield	Oct. 11	May 19
Yates Center	Oct. 12	Mar. 29
Kentucky:		
Bowling Green	Sept. 24	May 18
Frankfort	Sept. 24	May 15
Lexington [1]	Oct. 31	Mar. 30
Louisville [1]	Oct. 22	May 15
Louisiana:		
Grand Coteau	Nov. 29	Jan. 19
Liberty Hill	(2)	Mar. 22
Mandeville	Sept. 21	Feb. 28
New Iberia	(2)	Feb. 28
New Orleans [1]	Dec. 29	Dec. 30
Shreveport [1]	Oct. 13	Mar. 11
Vidalia	(2)	Mar. 22
Maine:		
Eastport [1]	Oct. 15	Apr. 26
Gardiner	Sept. 24	May 4
Lewiston	Oct. 12	May 3
Orono	Sept. 24	May 22
Portland [1]	Oct. 13	Mar. 11
Maryland:		
Baltimore [1]	Oct. 31	Mar. 19
Barren Creek	Sept. 25	May 8
Gaithersburg	Oct. 20	(3)
Massachusetts:		
Amherst	Sept. 17	May 8
Blue Hill	Aug. 8	May 3
Boston [1]	Oct. 13	Apr. 25
Dudley	Sept. 24	(3)
Fitchburg	Oct. 12	Apr. 25
Nantucket [1]	Nov. 5	Apr. 10
Somerset	Oct. 15	May 3
Westborough	Sept. 17	May 18
Wood's Holl [1]	Nov. 6	Apr. 26
Michigan:		
Adrian	Oct. 14	May 1
Alpena [1]	Sept. 16	Apr. 21
Detroit [1]	Oct. 22	May 14
Escanaba [1]	Sept. 10	(3) (3)
Grand Haven [1]	Sept. 24	May 25
Greenville	Oct. 15	May 1
Hanover	Oct. 15	May 20
Hart	(2)	May 21
Hudson	Sept. 7	May 2
Ingalls	Sept. 4	May 6
Kalamazoo	Oct. 25	Apr. 12
Lansing [1]	Sept. 24	Apr. 25
Mackinaw City [1]	Sept. 24	Mar. 30
Marquette [1]	Sept. 16	May 2
Port Huron [1]	Sept. 26	May 16
Saint John's	Sept. 24	Apr. 17
Saint Louis	Sept. 24	May 16
Minnesota:		
Delano	Sept. 10	May 19
Duluth [1]	Oct. 5	May 16
Grand Meadow	(2)	May 17
Moorhead [1]	Sept. 10	June 1
Morris	Sept. 23	May 14
Red Wing	Sept. 23	May 19
Rolling Green	Oct. 4	May 14
Saint Paul [1]	Oct. 5	May 13
Saint Vincent [1]	Aug. 24	June 6
Mississippi:		
University [1]	Oct. 31	Feb. 13
Vicksburg [1]	Oct. 31	Mar. 22
Missouri:		
Fayette	Sept. 24	May 14
Ironton	Sept. 24	May 15
Kirksville	Oct. 24	Apr. 19
Lamar [1]	Oct. 12	Apr. 20
Lexington	Oct. 12	(3)
Mexico	Oct. 12	Apr. 20
Oregon	Oct. 12	May 14
Saint Charles	(2)	Mar. 29
Saint Louis [1]	Nov. 19	Mar. 14
Shelbina	Oct. 12	(3)
Springfield [1]	Oct. 12	May 1
Steelville	Oct. 12	May 14
Montana:		
Assinaboine, Fort [1]	Oct. 8	Apr. 29
Custer, Fort [1]	Oct. 8	May 12
Helena [1]	Sept. 22	May 3
Maginnis, Fort [1]	Sept. 15	June 24
Poplar River [1]	Sept. 15	Apr. 19
Virginia City	Oct. 2	May 17
Nebraska:		
Brownsville	Oct. 12	Apr. 30
Crete [1]	Oct. 11	May 14
De Soto	Oct. 12	Apr. 20
Fairbury	Oct. 12	May 14
Falls City	Oct. 11	Apr. 20
Fremont	Oct. 24	Apr. 12
Genoa	Oct. 11	Apr. 30
Nebraska City	Oct. 18	Apr. 20
North Platte [1]	Sept. 28	May 18
Omaha [1]	Oct. 12	Apr. 20

[1] Used to designate regular stations of the Signal Service. [2] No record.
[3] Station closed before last frost was to be expected.

Dates of the first and last killing frost, at regular and voluntary stations of the Signal Service, U. S. Army, etc.—Continued.

States and stations.	Dates of— First.	Dates of— Last.
Nebraska—Continued.		
Ravenna	Oct. 3	May 14
Syracuse	Oct. 11	(2)
Tecumseh	(2)	Mar. 26
Valentine[1]	Sept. 28	May 12
Weeping Waters	Sept. 23	June 2
Nevada:		
Carson City	(2)	May 21
Winnemucca[1]	Aug. 31	May 5
New Hampshire:		
Concord	Sept. 24	May 3
Manchester[1]	Sept. 24	May 3
Mount Washington[1]	(4)	(4)
New Jersey:		
Atlantic City	Nov. 21	Apr. 25
Beverly	Oct. 16	May 17
Billingsport	Oct. 13	Apr. 26
Bordentown	Sept. 25	May 3
Clayton	Oct. 12	Apr. 26
Dover	Sept. 17	May 17
Egg Harbor	Nov. 2	Apr. 9
Gillette	Nov. 3	May 3
Hopewell	Sept. 26	(2)
Imlayston	Sept. 25	May 21
Locktown	Oct. 12	May 21
Readington	Sept. 17	May 17
South Orange	Oct. 22	Apr. 22
Union	Sept. 17	May 5
New Mexico:		
Gallinas Spring	Oct. 20	Apr. 1
Las Vegas	Sept. 28	May 29
Stanton, Fort[1]	Oct. 19	Apr. 29
New York:		
Albany[1]	Oct. 15	Apr. 24
Auburn	Oct. 15	(2)
Brooklyn	Oct. 1	Apr. 13
Buffalo[1]	Oct. 15	Apr. 25
Carmel	Sept. 25	Apr. 9
Cooperstown	Sept. 17	(2)
Eden	Sept. 28	June 8
Factoryville	Sept. 18	May 17
Humphrey	Sept. 17	July 16
New York City[1]	Oct. 23	Apr. 13
Oswego[1]	Oct. 15	Apr. 25
Rochester[1]	Sept. 26	Apr. 25
Savona	Sept. 26	(2)
Utica	Aug. 8	May 8
North Carolina:		
Charlotte[1]	Oct. 16	Apr. 26
Hatteras[1]	Dec. 29	Mar. 7
Monroe	Sept. 25	May 15
Mt. Pleasant	Oct. 6	Apr. 26
Raleigh[1]	Nov. 2	Apr. 26
Salisbury	Sept. 25	Apr. 26
Tarborough	Nov. 13	Jan. 3
Weldon	Nov. 9	Apr. 26
Wilmington[1]	Nov. 2	Mar. 10
Ohio:		
Bangorville	Sept. 26	June 3
Bellevue	(2)	June 12
Celina	Oct. 12	Apr. 12
Cincinnati[1]	Oct. 22	Mar. 18
Clarksville	Sept. 24	Apr. 25
Cleveland[1]	Oct. 22	Apr. 25
Collinwood	Oct. 25	(2)
Columbus	Oct. 12	Apr. 25
Garrettsville	Sept. 26	May 21
Greenville	Sept. 24	Apr. 24
Jefferson	Oct. 16	Apr. 25
Napoleon	Sept. 17	May 2
North Lewisburgh	Oct. 15	May 20
Sandusky[1]	Oct. 15	Mar. 18
Tiffin	Oct. 18	Apr. 20
Toledo[1]	Oct. 15	Apr. 24
Wauseon	Sept. 17	May 20
Youngstown	Sept. 17	(2)
Oregon:		
Albany	Oct. 23	Mar. 10
Astoria[1]	Nov. 16	Mar. 9
Baudon	Sept. 12	Apr. 10
East Portland	Nov. 5	May 10
Eola	(2)	Apr. 11
McMinnville	(2)	May 5
Portland[1]	Oct. 24	Apr. 9
Roseburgh[1]	Oct. 23	Apr. 9
Yaquina	Nov. 16	Mar. 9
Pennsylvania:		
Corry	Sept. 17	May 21
Dyberry	Sept. 18	June 4
Erie[1]	Oct. 12	Apr. 25
Franklin	(2)	Apr. 25
Holidaysburg	(2)	May 17
Huntingdon	Sept. 24	(2)
New Bloomfield	Sept. 24	May 17
Quakertown	Sept. 17	May 17
Philadelphia[1]	Oct. 16	Mar. 19
Phillipsburgh	Aug. 30	May 22
Pittsburgh[1]	Oct. 15	May 17
Pottstown	Oct. 13	May 3
York	(2)	Apr. 21
Rhode Island:		
Block Island[1]	Nov. 9	Apr. 13
South Carolina:		
Charleston[1]	Nov. 21	Mar. 23
Columbia[1]	Nov. 13	Mar. 9
Newberry	Oct. 22	May 15
Statesburgh	Nov. 21	Mar. 23
Tennessee:		
Ashwood	Sept. 24	Apr. 25
Chattanooga[1]	Oct. 13	Mar. 23
Knoxville[1]	Oct. 13	Mar. 23
Memphis[1]	Oct. 12	Mar. 22
Milan	Oct. 31	Mar. 8
Nashville[1]	Oct. 12	Mar. 23
Riddleton	Sept. 25	May 15
Texas:		
Abilene[1]	Oct. 22	Mar. 7
Austin	Nov. 28	Feb. 22
Brownsville[1]	Dec. 21	Jan. 17
Cedar Hill	Nov. 20	Mar. 21
Cleburne	Oct. 21	Apr. 30
Comanche	(2)	May 28
Corpus Christi[1]	Dec. 21	Dec. 21
Corsicana	Nov. 11	Mar. 29
Davis, Fort[1]	Oct. 29	Feb. 25
Decatur	Nov. 11	Mar. 21
Elliott, Fort[1]	Oct. 24	Mar. 29
El Paso[1]	Nov. 15	Mar. 20
Galveston[1]	Dec. 22	Jan. 2
New Ulm	Nov. 28	Feb. 12
Palestine[1]	Dec. 12	Mar. 29
Rio Grande City[1]	Dec. 21	Dec. 25
San Antonio[1]	Nov. 28	Jan. 2
Utah:		
Frisco[1]	Nov. 24	(2)
Salt Lake City[1]	Oct. 18	Apr. 5
Vermont:		
Burlington	Sept. 17	Apr. 8
Charlotte	Oct. 15	(2)
Lunenburgh	Sept. 21	May 3
Manchester[1]	Oct. 15	Apr. 25
Northfield[1]	Sept. 11	May 3
Virginia:		
Dale Enterprise	Sept. 25	May 17
Lynchburgh[1]	Oct. 15	Apr. 26
Norfolk[1]	Oct. 23	Apr. 26
Rappahannock	Sept. 26	(2)
Washington:		
Canby, Fort[1]	Nov. 17	Mar. 7
Blakeley	Nov. 16	Mar. 26
Olympia[1]	Oct. 24	Apr. 16
Port Angeles[1]	Oct. 19	Apr. 27

[1] Used to designate regular stations of the Signal Service.
[2] No record.
[3] Station closed before last frost was to be expected.
[4] Frost every month.

Dates of the first and last killing frost, at regular and voluntary stations of the Signal Service, U. S. Army, etc.—Continued.

States and stations.	Dates of—	
	First.	Last.
Washington—Continued.		
Spokane Falls [1]	Sept. 20	Apr. 17
Tatoosh Island [1]	Jan. 3	Mar. 8
Walla Walla [1]	Oct. 23	Mar. 29
West Virginia:		
Middlebrook	Sept. 24	May 17
Parkersburgh	Sept. 26	Apr. 26
Wisconsin:		
Deuster	Sept. 16	June 3
Fond du Lac	Oct. 4	May 15
Fredonia	(2)	May 15
Wisconsin—Continued.		
Green Bay [1]	Sept. 16	May 16
La Crosse [1]	Oct. 5	May 14
Manitowoc	Oct. 21	(2)
Milwaukee [1]	Oct. 12	May 16
Waucousta	Aug. 24	May 19
Wyoming:		
Bridger, Fort [1]	Oct. 7	May 28
Cheyenne [1]	Sept. 27	May 18
McKinney, Fort [1]	(2)	May 17

[1] Used to designate regular stations of the Signal Service. [2] No record.

APPENDIX No. 30.

Mean relative humidity at stations of the Signal Service, U. S. Army, for each month, and the year 1887.

Stations.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Annual.
Alabama:													
Mobile	73.9	81.5	69.3	68.5	74.5	76.9	80.3	78.0	74.2	75.9	74.8	83.1	75.9
Montgomery	72.8	77.9	64.9	61.6	69.2	66.3	79.9	78.1	64.7	69.6	64.8	72.0	70.2
Alaska:													
Sitka[1]	72.2	74.0	73.6	72.0	73.4	76.4	85.4	83.9	80.7	.....	.....	.....	.....
Arizona:													
Apache, Fort	47.1	57.3	36.4	42.5	31.6	34.7	60.9	64.9	68.6	59.9	60.4	69.4	52.8
Grant, Fort	37.4	50.1	27.5	32.0	24.4	26.7	40.1	43.5	44.1	40.4	38.6	47.6	37.7
Thomas, Fort[2]	64.3	66.7	49.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Whipple Barracks	54.2	65.7	51.4	64.8	57.3	57.5	64.4	65.0	70.0	62.8	66.5	70.8	62.5
Yuma	47.0	56.8	60.1	64.5	59.1	43.4	45.1	49.2	56.1	48.3	57.2	56.5	53.6
Arkansas:													
Fort Smith	70.8	78.8	78.2	70.0	72.8	70.1	70.7	74.9	72.1	64.9	60.6	73.2	71.4
Little Rock	67.4	72.6	67.0	65.6	77.8	77.8	72.3	67.9	64.0	59.2	59 8	75.6	68.9
California:													
Bidwell, Fort	83.0	89.1	62.2	62.4	53.2	54.8	43.3	47.2	62.7	60.5	75.3	84.8	64.9
Eureka	89.0	85.4	83.6	86.8	84.7	86.8	90.4	87.4	89.1	88.8	88.4	89.9	87.5
Fresno City[3]	.....	.....	.....	.....	.....	.....	.....	.....	49.1	50.3	64.8	78.2	.....
Keeler	46.2	50.2	30.1	36.3	34.1	33.7	31.0	22.2	33.3	38.0	42.7	45.4	36.9
Los Angeles	66.3	81.5	78.5	78.9	72.9	78.5	82.7	80.9	82.0	72.7	78.1	74.4	77.3
Red Bluff	64.5	72.4	57.6	47.9	43.8	34.4	35.8	34.8	32.5	26.9	46.5	67.4	47.0
Sacramento	73.3	76.7	67.6	65.5	62.9	59.2	59.1	60.7	53.3	46.0	62.8	77.6	63.7
San Diego	69.7	75.1	79.1	75.8	73.9	80.5	81.2	79.6	83.7	72.4	76.8	70.7	76.5
San Francisco	74.3	75.7	75.0	71.6	75.4	75.5	83.2	81.9	75.0	65.0	77.6	75.1	75.4
Colorado:													
Colorado Springs[4]	.....	.....	.....	.....	.....	.....	60.5	59.7	57.8	58.8	50.1	59.5	.....
Denver	53.5	51.1	43.1	47.1	47.4	43.8	52.8	54.6	60.0	56.0	52.0	52.0	51.2
Las Animas	70.1	65.1	62.1	73.2	69.4	70.4	51.6	52.9	57.2	53.7	45.6	63.5	61.2
Montrose	67.1	60.6	47.1	48.7	35.7	30.8	44.8	48.7	53.7	50.6	57.8	62.6	50.7
Pike's Peak	83.0	83.2	74.1	80.1	79.3	73.6	69.4	70.0	77.4	75.3	61.7	74.2	75.2
Connecticut:													
New Haven	77.2	72.0	63.1	60.5	68.2	73.9	81.6	78.1	76.0	71.2	70.4	78.8	72.6
New London	79.7	78.0	72.7	69.7	76.2	79.1	84.2	78.9	77.3	75.6	73.7	75.3	76.7
Dakota:													
Bismarck	95.3	92.9	85.9	68.7	66.4	63.8	67.2	73.9	69.6	71.5	71.4	87.7	76.2
Buford, Fort	89.0	86.6	77.4	65.2	55.2	61.0	62.3	70.8	62.3	67.0	70.7	81.2	70.7
Deadwood	79.8	75.6	69.4	71.5	67.8	67.8	72.9	80.4	78.5	79.3	73.1	79.6	74.6
Huron	76.4	78.8	73.7	61.3	57.1	65.5	65.3	72.4	67.1	61.3	58.4	77.4	67.9
Sully, Fort	72.2	69.5	73.9	70.0	56.6	62.1	60.4	71.8	62.5	63.1	61.1	80.1	66.9
Totten, Fort	79.8	79.8	79.9	73.2	64.1	67.9	75.0	75.9	71.4	72.3	75.7	88.3	75.3
Yankton	74.3	74.6	74.8	69.2	66.0	72.4	73.0	76.6	80.3	68.1	66.8	78.8	72.9
District of Columbia:													
Washington City	67.9	70.6	59.6	61.7	69.3	68.0	71.9	72.8	72.9	65.9	60.1	69.7	67.5
Florida:													
Cedar Keys	85.1	87.0	73.4	78.4	75.6	77.6	76.6	74.3	76.3	77.0	75.1	82.7	78.3
Jacksonville	82.6	83.5	74.2	73.2	73.6	75.6	76.3	78.7	80.5	80.0	79.0	84.8	78.5
Key West	83.2	78.7	74.8	77.2	72.3	80.9	74.9	75.9	77.0	80.5	77.6	80.5	77.8
Pensacola	78.4	85.0	74.4	74.3	75.8	73.3	78.5	75.5	73.6	75.3	74.7	82.2	76.8
Sanford[5]	74.4	79.2	70.4	73.5	74.7	78.8	.....	.....	.....	.....	.....	.....	.....
Titusville[6]	.....	.....	.....	.....	.....	84 0	83.5	81.2	80.5	80.4	75.3	79.2	.....
Georgia:													
Atlanta	73.2	86.4	77.1	50.5	64.7	62.8	77.4	72.6	61.8	65.4	59.9	72.9	68.7
Augusta	78.2	83.7	74.4	65.3	69.6	67.6	76.6	79.3	68.9	72.8	68.7	70.4	73.0
Savannah	69.6	80.0	60.1	68.4	73.0	77.0	81.1	78.3	81.8	80.2	73.3	77.8	75.0
Idaho:													
Boisé City	76.6	76.7	59.6	55.8	52.4	56.7	39.1	40.4	45.8	51.0	60.4	75.8	57.5
Illinois:													
Cairo	69.0	75.4	61.1	57.8	73.6	70.7	71.5	63.8	68.1	62.3	58.6	70.8	66.9
Chicago	78.9	83.3	74.8	62.2	67.9	70.0	67.0	67.9	71.8	70.5	70.9	78.4	72.0
Springfield	69.9	72.9	67.0	62.8	68.2	70.0	69.8	61.4	69.0	66.9	62.9	75.4	68.0

[1] Station closed September 30, 1887.
[2] Station closed.
[3] Observations began August 16, 1887.
[4] Observations began July 1, 1887.
[5] Closed June 30, 1887.
[6] Observations began June, 1887.

Mean relative humidity at stations of the Signal Service, U. S. Army, etc.—Continued.

Stations.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Annual.
Indiana:													
Indianapolis	77.0	81.3	67.4	59.6	67.4	59.2	57.0	58.6	65.1	59.3	60.8	78.9	66.0
Indian Territory:													
Sill, Fort	49.5	68.3	48.2	59.8	66.6	71.3	57.6	64.1	71.5	70.0	59.7	74.9	63.5
Iowa:													
Davenport	79.2	82.3	71.8	56.8	59.6	64.0	60.5	61.8	69.1	61.8	69.1	67.6	67.0
Des Moines	81.8	83.1	71.8	58.5	59.0	67.4	61.6	63.9	70.7	65.9	67.4	81.0	69.3
Dubuque	69.3	75.9	75.2	63.6	64.4	66.5	64.2	68.9	75.6	70.7	74.3	81.1	70.8
Keokuk	78.7	82.8	72.1	59.9	66.5	66.8	60.1	58.0	64.7	62.3	62.6	80.3	67.9
Kansas:													
Concordia	70.7	77.8	66.5	67.3	61.0	68.2	59.0	69.0	70.9	57.0	53.4	67.0	65.6
Dodge City	63.6	65.7	50 3	55.4	61.1	64.1	55.1	64.6	67.0	58.1	52.6	71.3	60.7
Leavenworth	70.5	75.2	62.1	58.8	65.3	72.2	64.8	73.2	74.4	64.7	65.4	74.2	68.4
Topeka[1]	.....	.....	.....	.....	.....	72.3	65.8	80.2	80.7	73.7	71.7	78.6	.....
Kentucky:													
Louisville	70.2	74.1	60.1	55.3	63.3	58.1	61.6	55.8	57.1	54.9	57.1	72.5	61.7
Louisiana:													
New Orleans	73.3	81.3	70.1	71.4	74.5	79.4	81.3	80.0	76.8	74.2	73.5	81.1	76.4
Shreveport	71.2	78.0	68.2	66.5	71.1	71.3	77.0	74.4	70.8	72.5	72.7	83.5	73.1
Maine:													
Eastport	79.9	73.8	73.2	72.2	80.7	80.3	88.2	80.2	79.0	75.0	73.3	76.3	77.7
Portland	82.9	76.4	72.0	62.8	68.0	75.0	79.9	74.6	72.4	70.9	68.3	75.5	73.2
Maryland:													
Baltimore	68.4	70.5	60.7	58.9	67.1	65.2	70.1	70.7	70.0	63.4	59.8	67.8	66.0
Massachusetts:													
Boston	73.1	69.4	65.8	62.2	67.6	71.7	77.0	74.2	73.4	76.9	75.2	78.6	72.1
Nantucket	84.6	83.6	81.5	76.5	76.8	81.3	85.9	80.3	78.4	78.7	76.7	78.9	80.3
Wood's Holl[2]	.....	.....	.....	.....	80.7	84.6	90.2	85.0	84.1	95.1	97.1	98.4	.....
Michigan:													
Alpena	83.5	83.5	78.4	79.3	75.5	79.0	77.0	73.8	75.7	76.8	79.3	88.5	79.2
Detroit	71.9	78.6	76.2	71.0	65.4	71.1	65.0	65.9	73.4	72.5	72.8	81.2	72.1
Escanaba	79.3	78.5	74.3	83.9	76.5	76.3	76.1	74.3	73.1	71.8	74.1	82.0	76.7
Grand Haven	80.9	81.7	68.9	64.3	66.5	70.8	71.2	74.4	75.9	73.5	76.2	84.5	74.1
Lansing	80.8	81.7	77.5	67.8	72.2	76.9	76.8	76.0	83.4	83.2	83.4	85.1	78.7
Mackinaw City	68.3	69.0	63.0	77.3	76.9	81.3	78.8	69.5	72.5	76.1	78.3	85.2	74.5
Marquette	76.2	76.9	77.6	77.5	72.7	79.6	77.5	76.1	72.5	73.3	74.4	76.0	75.9
Port Huron	76.3	77.7	77.9	75.1	76.8	78.6	73.4	73.0	74.2	74.3	77.1	85.2	76.6
Minnesota:													
Duluth	79.6	82.2	74.3	74.0	73.8	80.1	76.2	76.6	74.1	71.1	75.1	79.6	76.4
Moorhead	73.0	74.3	73.5	73.5	62.9	70.0	78.1	77.6	71.2	68.3	73.9	87.0	73.6
Saint Paul	77.7	80.0	75.7	70.6	62.8	73.7	70.7	76.3	78.7	74.1	74.8	85.4	75.0
Saint Vincent	79.6	83.6	85.0	85.3	80.4	76.0	81.1	83.2	77.7	72.0	78.7	86.3	80.7
Mississippi:													
Vicksburg	64.8	72.7	61.1	59.0	72.2	72.0	80.9	75.5	72.8	77.4	66.8	81.0	71.4
University[3]	.....	.....	.....	.....	.....	76.0	85.1	72.6	64.7	72.2	68.0	77.0	.....
Missouri:													
Lamar	65.1	74.7	59.5	54.3	70.5	68.0	67.6	73.4	78.9	69.0	67.6	75.4	68.7
Saint Louis	66.9	70.2	59.9	48.0	62.3	58.8	57.1	52.2	60.9	55.6	54.3	77.4	60.3
Montana:													
Assinaboine, Fort	63.9	60.2	56.9	48.8	41.0	61.2	53.2	61.2	61.4	61.1	57.5	65.8	57.7
Custer, Fort	80.2	79.4	69.4	60.1	50.7	55.9	48.8	50.7	54.8	65.3	58.9	67.2	61.8
Helena	72.9	78.6	71.2	70.3	72.6	74.9	54.4	49.7	48.8	53.7	57.4	62.5	63.9
Maginnis, Fort	70.7	68.9	56.7	56.8	41.4	55.0	57.1	69.7	71.3	70.7	75.5	83.6	64.8
Poplar River	76.7	78.9	71.2	68.3	62.4	66.4	69.0	74.7	71.1	76.0	76.0	80.6	72.6
Nebraska:													
Crete[4]	.....	.....	.....	.....	.....	.....	65.6	71.1	72.9	64.1	68.9	83.0	.....
North Platte	77.9	76.8	69.5	65.9	61.9	69.9	67.9	73.4	74.1	72.7	71.0	75.4	71.4
Omaha	67.8	81.5	69.8	61.3	57.1	68.4	64.5	67.8	68.8	57.6	57.8	72.5	66.2
Valentine	76.7	67.8	55.1	56.7	56.4	60.8	60.1	69.4	63.5	60.6	57.9	71.7	63.1
Nevada:													
Winnemucca	56.8	65.4	41.4	46.9	36.0	40.0	30.2	24.4	34.5	42.4	56.6	76.9	46.0
New Hampshire:													
Manchester[5]	.....	.....	75.4	65.0	59.9	71.7	77.4	80.1	81.0	73.3	70.3	75.0	.....
Mount Washington[6]	93.1	93.9	92.0	89.6	77.5	88.7	90.4	87.6	86.7	.....	.....	.....	.....
New Jersey:													
Atlantic City	81.6	82.6	80.0	82.6	84.8	84.0	87.2	84.4	87.0	90.0	90.0	81.6	84.6
New Mexico:													
Santa Fé	53.2	57.5	41.3	39.6	39.9	42.7	47.5	49.2	59.6	49.1	46.3	59.5	48.8
Stanton, Fort	57.2	59.9	50.5	43.3	50.3	61.0	67.4	70.9	75.9	68.1	62.6	61.4	60.7
New York:													
Albany	74.7	76.9	75.7	71.2	73.6	68.7	71.9	71.2	75.8	72.2	70.3	79.0	73.4
Buffalo	83.6	84.0	81.7	72.8	65.6	75.5	71.0	65.7	69.5	71.5	70.3	77.7	74.1
New York City	70.7	68.1	61.3	55.9	63.8	69.5	74.0	69.2	69.0	64.6	61.4	71.1	66.6
Oswego	82.0	80.5	73.1	65.0	69.6	81.5	79.3	72.1	70.1	74.3	72.5	84.4	75.4
Rochester	84.0	84.5	78.9	63.4	66.7	77.7	70.0	72.8	69.4	74.6	71.7	82.9	74.7

[1] Observations began June 1, 1887.
[2] Observations began May 1, 1887.
[3] Observations began June, 1887.
[4] Observations began July, 1887.
[5] Observations began March, 1887.
[6] Closed October 1, 1887.

Mean relative humidity at stations of the Signal Service, U. S. Army, etc.—Continued.

Stations.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Annual.
North Carolina:													
Charlotte	67.3	78.8	63.9	66.1	73.0	66.9	81.7	80.1	70.3	70.8	65.1	72.9	71.4
Hatteras	82.0	84.2	75.9	78.5	77.7	83.6	85.9	81.1	77.1	81.1	77.8	87.6	81.0
Raleigh	76.8	79.1	64.3	61.4	70.5	69.6	80.1	84.5	81.8	81.2	75.7	78.4	75.3
Wilmington	73.6	80.7	67.4	68.5	74.3	71.4	81.8	88.1	77.8	77.7	74.3	75.4	75.9
Ohio:													
Cincinnati	71.4	76.8	67.1	60.4	67.3	65.7	63.2	59.6	58.3	55.4	61.3	71.7	64.8
Cleveland	77.2	82.8	77.0	70.4	69.9	73.0	69.8	67.2	71.2	66.6	69.7	77.7	72.7
Columbus	69.5	74.4	66.8	59.7	64.8	64.6	62.8	59.5	62.8	61.4	67.2	72.5	65.5
Sandusky	80.4	85.4	76.7	66.4	74.4	72.9	69.3	66.3	72.5	66.5	71.4	78.6	73.4
Toledo	76.9	79.8	69.0	62.0	65.4	70.5	66.3	64.9	72.1	65.2	69.3	79.3	70.1
Oregon:													
Astoria[1]	.....	.....	83.8	80.3	78.8	70.4	77.4	80.4	81.1	83.8	85.6	89.2	.....
Portland	90.3	80.0	75.8	74.8	63.2	60.2	61.9	69.4	73.6	78.5	82.7	89.8	75.0
Roseburgh	84.5	83.5	72.1	67.6	65.0	60.3	60.2	65.6	60.2	71.2	82.9	84.3	71.4
Pennsylvania:													
Erie	79.2	82.4	78.3	71.4	67.9	73.0	67.5	67.6	76.5	77.0	76.6	81.0	74.9
Philadelphia	68.6	76.6	63.9	57.8	63.3	66.5	71.3	68.9	69.7	66.3	62.4	71.4	67.2
Pittsburgh	73.4	77.0	66.7	64.8	66.5	65.8	62.8	65.9	63.7	68.9	68.1	71.1	67.9
Rhode Island:													
Block Island	86.1	86.0	80.7	78.5	81.6	85.0	89.3	84.2	82.6	80.1	78.1	83.2	83.0
South Carolina:													
Charleston	78.5	84.0	68.5	73.5	75.1	77.5	80.6	78.1	76.9	75.6	75.4	80.5	77.0
Columbia[2]	.....	.....	.....	.....	.....	65.8	80.7	81.9	73.8	76.0	68.9	78.3	.....
Tennessee:													
Chattanooga	67.1	75.9	62.4	49.7	66.7	67.4	78.0	73.0	65.2	70.0	61.8	79.4	68.0
Knoxville	68.5	78.4	68.3	65.5	73.8	70.8	74.3	72.9	67.2	66.5	59.2	75.0	70.0
Memphis	72.9	81.5	67.7	54.2	70.7	67.5	75.6	70.4	66.9	67.1	62.2	73.5	69.2
Nashville	67.4	74.5	65.3	55.4	70.4	69.5	70.5	63.2	62.0	66.2	64.2	78.5	67.3
Texas:													
Abilene	48.2	57.8	39.5	50.8	57.0	59.4	53.2	61.2	67.7	69.7	71.2	81.4	59.8
Brownsville	81.1	84.3	80.3	80.8	84.3	87.7	83.8	83.4	86.7	85.1	86.3	85.6	84.1
Corpus Christi[2]	.....	80.1	74.8	80.5	81.7	81.4	80.4	81.2	79.1	76.2	81.9	83.9	.....
Davis, Fort	24.0	31.2	26.6	30.5	32.5	45.5	44.7	51.3	65.5	63.0	53.0	44.1	42.7
Elliott, Fort	58.7	64.7	45.9	58.6	63.4	66.6	59.5	68.1	68.9	62.4	54.1	73.9	62.1
El Paso	41.6	49.0	40.7	29.9	32.5	43.2	49.5	59.4	67.5	62.4	59.0	63.7	49.9
Galveston	78.1	84.0	74.7	76.2	78.0	75.6	73.8	73.8	73.0	71.6	71.1	82.0	76.0
Palestine	71.5	73.7	66.1	66.6	73.4	73.0	71.7	71.4	72.8	70.3	66.9	81.1	71.5
Rio Grande City	52.4	60.6	60.0	61.5	64.6	73.0	66.9	65.8	74.5	72.2	78.0	75.8	67.1
San Antonio	57.3	69.5	57.8	65.8	69.7	71.2	66.3	71.1	72.0	65.9	67.9	71.3	67.2
Utah:													
Frisco	55.8	64.0	41.4	53.5	38.9	30.5	30.9	29.0	29.0	39.4	42.3	65.3	43.3
Salt Lake City	71.7	68.0	54.7	58.9	53.9	48.7	48.7	40.0	44.1	43.7	46.8	67.3	53.9
Vermont:													
Northfield[1]	.....	.....	72.8	68.4	71.3	79.6	81.1	83.1	81.3	81.5	79.8	83.7	.....
Virginia:													
Chincoteague[4]	78.4	79.6	77.0	77.8	83.6	82.8	.....	.....	.....	.....	.....	.....	.....
Lynchburgh	70.0	71.7	60.7	66.5	71.1	71.4	76.1	77.0	75.5	75.3	66.8	70.1	71.0
Norfolk	75.5	77.1	69.7	67.9	73.0	74.8	78.6	81.1	77.9	80.8	77.9	81.6	76.3
Washington Territory:													
Canby, Fort	93.8	86.8	86.7	86.6	81.8	80.5	87.4	89.3	88.1	88.1	88.7	93.5	87.6
Olympia	93.1	84.9	85.5	79.2	76.5	75.8	76.2	77.7	81.5	89.1	88.7	91.1	83.2
Port Angeles	90.9	89.2	89.1	83.8	81.8	81.9	84.6	87.7	89.9	92.7	88.9	90.0	87.5
Spokane Falls	85.3	86.0	82.9	73.3	61.2	67.4	51.2	59.1	70.6	76.5	81.0	83.1	78.1
Tatoosh Island	85.4	80.5	83.7	81.3	81.9	84.3	92.1	94.2	91.9	89.3	84.6	88.3	85.6
Walla Walla	67.8	81.1	58.2	54.9	46.5	48.7	36.2	41.8	57.6	66.8	78.8	70.8	59.1
Wisconsin:													
Green Bay	83.9	87.6	82.4	71.8	63.4	71.3	66.4	70.7	77.3	73.6	74.2	87.2	75.8
La Crosse	72.9	83.6	72.3	64.3	62.0	65.2	70.0	70.0	77.1	66.7	71.2	85.8	71.8
Milwaukee	82.3	85.3	76.1	70.3	67.3	74.7	71.1	75.1	74.9	69.6	75.9	85.6	75.7
Wyoming:													
Bridger, Fort	62.4	60.4	55.8	61.2	56.8	49.2	47.3	50.7	47.7	53.7	52.6	58.6	54.7
Cheyenne	(5)	(5)	49.7	49.8	49.4	46.4	54.6	59.8	46.0	49.0	38.8	55.0	.....

[1] Observations began March, 1887.
[2] Observations began June, 1887.
[3] Observations began February, 1887.
[4] Closed June 30, 1887.
[5] No observations.

Extremes of relative humidity in the United States—Signal Service observations.

Stations.	Least.		Stations.	Greatest.	
	No. of years' record.	Percentage of relative humidity.		No. of years' record.	Percentage of relative humidity.
Keeler, Cal	2	40	Port Angeles, Wash	3	88
Fort Grant, Ariz	9	41	Fort Canby, Wash	4	86
Santa Fé, N. Mex	10	45	Mount Washington, N. H	15	86
Yuma, Ariz	9	45	Tatoosh Island, Wash	4	86
Winnemucca, Nev	7	46	Hatteras, N. C	7	81
Frisco, Utah	2	46	Saint Vincent, Minn	7	81
El Paso, Tex	9	48	Block Island, R. I	7	81
Denver, Colo	16	50	Atlantic City, N. J	14	80
Fort Davis, Tex	8	51	Olympia, Wash	10	80
Prescott, Ariz	10	51	Brownsville, Tex	10	79
Camp Thomas, Ariz	6	51	Oswego, N. Y	17	78
Montrose, Colo	2	53	Cedar Keys, Fla	8	77
Fort Apache, Ariz	9	54	Eastport, Me	14	76
Red Bluff, Cal	10	54	Port Huron, Mich	13	76
Fort Elliott, Tex	7	56	Pensacola, Fla	8	76

Fifteen stations of the Signal Service having the least average cloudiness, and fifteen stations having the greatest average cloudiness; also the average number of clear, fair, cloudy, and rainy days at each station.

LEAST.

Stations.	Number of years' record.	Average cloudiness. Scale 0 to 10.	Average number of days.			
			Clear.	Fair.	Cloudy.	Rainy.
Yuma, Ariz	12	1.7	277.4	73.0	14.8	12.6
Keeler, Cal	3	1.8	272.5	78.0	14.5	22.5
Prescott, Ariz	12	2.4	234.9	103.1	27.2	61.9
Sacramento, Cal	11	2.4	243.6	76.2	45.4	68.7
Fort Stanton, N. Mex	2	2.6	227.0	112.0	25.0	69.5
Frisco, Utah	2½	2.8	220.0	108.5	36.5	51.0
El Paso, Tex	10	2.9	219.5	116.0	29.6	53.2
Fort Davis, Tex	10	3.0	204.2	115.8	43.2	60.2
Los Angeles, Cal	10½	3.3	176.7	150.3	48.2	41.5
Winnemucca, Nev	9	3.3	197.3	118.0	49.8	65.4
Abilene, Tex	2	3.6	179.0	135.0	51.0	61.5
Fort Grant, Ariz	10	3.6	210.3	111.3	43.3	70.7
Montrose, Colo	3	3.6	180.0	134.0	51.0	77.0
Denver, Colo	16	3.8	159.3	151.6	54.1	85.4
Las Animas, Colo	6	3.9	149.2	161.8	54.2	70.4

GREATEST.

Tatoosh Island, Wash	4	6.3	68.5	134.5	162.2	186.0
Oswego, N. Y	17	6.3	67.5	124.4	173.4	148.2
Rochester, N. Y	16	6.1	69.6	134.1	161.6	171.1
Olympia, Wash	10	6.1	74.1	128.9	162.2	164.0
Fort Canby, Wash	4	6.0	81.2	130.8	152.8	174.5
Buffalo, N. Y	16	6.0	77.1	138.3	149.7	169.4
Erie, Pa	14	5.9	82.5	137.9	144.8	177.4
Portland, Oregon	16	5.9	92.3	106.1	166.6	156.5
Port Huron, Mich	13	5.8	81.1	155.5	128.7	150.9
Alpena, Mich	15	5.7	83.4	145.7	135.7	166.6
Cleveland, Ohio	16	5.7	86.8	143.7	134.8	161.0
Mackinaw City, Mich	5	5.7	88.2	147.6	129.4	160.4
Marquette, Mich	16	5.7	82.1	146.9	136.0	153.9
Pittsburgh, Pa	16	5.7	80.7	162.8	121.8	153.6
Escanaba, Mich	16	5.7	81.9	155.2	127.9	151.9

APPENDIX No. 31.

Fifteen stations of the Signal Service having the least daily differences of mean temperature for each month, and the average monthly; computed from seven years' observations.

[Stations arranged in order of least to greatest variability.]

	San Diego, Cal.	Tatoosh Island, Wash.[1]	Key West, Fla.	Fort Canby, Wash.[1]	San Francisco, Cal.	Los Angeles, Cal.	Yuma, Ariz.	Sacramento, Cal.	Keeler, Cal.[2]	Olympia, Wash.	Red Bluff, Cal.	Portland, Oregon.	Prescott, Ariz.	Galveston, Tex.	Roseburgh, Oregon.
January:															
Average variability for the month	2.0	2.5	2.9	2.5	1.9	2.6	2.4	2.2	2.9	3.2	3.5	3.5	4.0	6.0	3.7
Average number of times daily change was 0° to 5°	29.7	27.5	25.0	28.5	29.4	27.9	29.0	29.1	24.5	25.0	28.2	25.6	23.6	18.6	24.9
Average number of times daily change was 6° to 10°	1.3	3.0	5.4	2.5	1.0	3.0	2.0	1.3	6.0	5.4	2.7	5.0	5.6	8.4	5.0
Absolute number of times daily change was 11° to 15° and over	0	2	4	0	0	0	2	0	1	4	1	3	13	37	4
February:															
Average variability for the month	2.0	2.2	2.3	2.3	2.2	2.7	2.5	2.2	3.0	3.2	2.6	3.0	3.5	4.5	3.7
Average number of times daily change was 0° to 5°	26.9	26.5	24.7	26.0	26.3	25.7	26.0	26.4	22.0	23.0	26.2	23.9	27.1	19.7	22.7
Average number of times daily change was 6° to 10°	1.3	1.8	3.1	2.2	1.4	2.3	2.5	1.3	5.0	4.9	1.8	3.6	5.9	5.9	4.3
Absolute number of times daily change was 11° to 15° and over	0	0	2	0	1	1	2	1	2	3	1	2	4	17	5
March:															
Average variability for the month	1.6	1.7	2.4	2.2	2.1	2.3	2.2	2.1	2.4	2.6	2.4	2.7	3.1	3.3	2.8
Average number of times daily change was 0° to 5°	30.3	30.0	27.0	28.5	29.0	28.3	29.0	29.6	28.3	27.7	28.5	28.1	26.4	25.0	28.1
Average number of times daily change was 6° to 10°	0.7	1.0	3.6	2.2	1.4	2.6	2.0	1.1	2.0	3.1	2.5	2.9	4.6	5.0	2.7
Absolute number of times daily change was 11° to 15° and over	0	0	1	0	0	1	0	0	1	1	0	0	0	7	0
April:															
Average variability for the month	1.5	1.5	1.7	2.3	1.9	2.4	2.9	2.4	3.0	2.2	3.0	2.7	3.5	2.4	3.2
Average number of times daily change was 0° to 5°	29.4	30.0	26.4	27.2	28.3	28.4	25.3	27.3	24.3	28.4	27.5	26.9	24.1	27.3	25.3
Average number of times daily change was 6° to 10°	0.6	0.0	1.6	2.2	0.6	1.4	4.1	2.1	5.3	1.6	2.3	3.1	4.7	2.4	4.6
Absolute number of times daily change was 11° to 15° and over	0	0	0	2	0	1	1	0	1	0	1	0	9	2	1
May:															
Average variability for the month	1.1	1.5	1.3	2.6	2.4	1.9	2.4	2.7	2.3	2.9	3.3	3.5	3.0	2.6	3.2
Average number of times daily change was 0° to 5°	30.7	30.5	30.4	27.8	27.9	29.7	27.7	27.7	25.7	27.0	26.5	25.1	27.0	29.6	26.7
Average number of times daily change was 6° to 10°	0.3	0.5	0.6	2.2	2.7	0.7	3.1	3.0	5.0	3.7	3.8	5.6	3.4	1.4	3.7
Absolute number of times daily change was 11° to 15° and over	0	0	0	4	1	0	1	2	1	2	3	3	3	0	2
June:															
Average variability for the month	1.1	1.3	1.3	1.6	1.8	1.6	2.1	2.6	2.7	2.6	3.5	2.9	2.8	1.1	2.8
Average number of times daily change was 0° to 5°	30.0	29.5	29.6	29.2	28.3	29.0	27.7	26.4	25.7	27.0	25.0	26.0	27.4	29.9	27.1
Average number of times daily change was 6° to 10°	0.0	0.5	0.4	0.5	1.1	0.7	2.3	2.6	4.0	2.7	4.2	3.6	3.8	0.1	2.7
Absolute number of times daily change was 11° to 15° and over	0	0	0	2	2	0	0	2	1	0	3	3	1	0	1
July:															
Average variability for the month	1.0	1.2	1.2	1.4	1.6	1.4	1.7	2.6	1.8	2.4	3.0	2.6	2.1	1.0	2.6
Average number of times daily change was 0° to 5°	31.0	30.0	30.6	30.0	29.9	30.6	30.1	27.6	29.3	28.3	26.8	27.9	30.0	31.0	28.4

[1] Five years' record. [2] Three years' record.

Fifteen stations of the Signal Service having the least daily differences of mean temperature for each month, etc.—Continued.

	San Diego, Cal.	Tatoosh Island, Wash.[1]	Key West, Fla.	Fort Canby, Wash.[1]	San Francisco, Cal.	Los Angeles, Cal.	Yuma, Ariz.	Sacramento, Cal.	Keeler, Cal.[2]	Olympia, Wash.	Red Bluff, Cal.	Portland, Oregon.	Prescott, Ariz.	Galveston, Tex.	Roseburgh, Oregon.
July—Continued.															
Average number of times daily change was 6° to 10°	0.0	1.0	0.4	1.0	0.9	0.4	0.5	3.1	1.7	2.4	3.8	2.7	1.4	0.0	1.7
Absolute number of times daily change was 11° to 15° and over	0	0	0	0	0	0	0	2	0	0	0	0	0	0	1
August:															
Average variability for the month	1.2	1.7	1.3	1.4	3.6	1.7	2.1	2.6	2.0	2.1	2.8	2.6	2.1	1.0	2.4
Average number of times daily change was 0° to 5°	30.9	31.0	29.7	30.5	29.7	28.7	28.4	27.6	29.3	30.0	25.7	28.7	29.0	30.9	27.7
Average number of times daily change was 6° to 10°	0.1	0.0	0.6	0.5	1.0	1.0	2.1	2.6	1.7	1.0	2.5	2.3	2.0	0.1	1 4
Absolute number of times daily change was 11° to 15° and over	0	0	0	0	0	0	3	4	0	0	2	0	0	0	0
September:															
Average variability for the month	1.2	1.4	1.3	2.1	2.4	2.1	2.3	2.8	2.1	2.1	3.1	2.8	2.4	1.6	2.8
Average number of times daily change was 0° to 5°	29.3	30.0	29.4	27.4	27.0	28.1	27.0	26.3	27.7	28.0	26.5	26.6	27.1	28.6	26.8
Average number of times daily change was 6° to 10°	0.7	0.0	0.6	1.6	2.3	1.3	2.7	3.1	2.0	2.0	3.0	3.1	2.4	1.3	3.2
Absolute number of times daily change was 11° to 15° and over	0	0	0	3	3	4	2	2	1	0	2	0	3	0	0
October:															
Average variability for the month	1.7	1.5	1.2	1.9	2.1	2.3	2.2	2.4	2.7	2.8	2.5	2.9	3.0	2.6	3.0
Average number of times daily change was 0° to 5°	29.9	30.0	30.7	29.8	28.6	27.7	28.4	28.4	26.0	26.3	27.9	27.9	26.3	26.6	26.7
Average number of times daily change was 6° to 10°	1.3	0.8	0.3	1.2	1.7	3.3	2.3	2.3	4.0	4.0	2.4	3.0	3.6	4.1	4.1
Absolute number of times daily change was 11° to 15° and over	1	0	0	0	1	0	2	0	3	0	0	0	6	1	0
November:															
Average variability for the month	1.9	1.9	1.6	1.9	1.7	2.7	2.4	1.8	2.6	3.0	2.5	2.8	3.1	4.7	2.9
Average number of times daily change was 0° to 5°	28.9	28.6	27.7	28.8	29.4	26.7	27.6	28.7	26.3	24.0	23.0	26.7	25.3	21.0	24.0
Average number of times daily change was 6° to 10°	1.1	1.4	1.9	1.2	0.3	3.3	2.1	1.0	3.3	5.4	1.7	3.3	4.0	6.0	3.7
Absolute number of times daily change was 11° to 15° and over	0	0	1	0	0	0	0	0	1	2	1	0	5	21	3
December:															
Average variability for the month	2.1	2.3	2.8	2.2	2.0	2.7	2.4	2.4	2.8	3.3	3.1	3.2	3.4	5.5	4.0
Average number of times daily change was 0° to 5°	29.9	29.2	26.3	30.4	29.6	26.7	28.3	28.7	26.0	24.7	26.3	26.1	24.9	18.9	24.1
Average number of times daily change was 6° to 10°	1.1	1.4	4.3	1.8	1.0	3.9	2.1	2.3	4.3	6.0	4.0	3.9	5.1	7.9	5.4
Absolute number of times daily change was 11° to 15° and over	0	2	3	0	0	0	1	0	2	3	2	5	7	30	6
Average monthly:															
Variability	1.5	1.7	1.8	2.0	2.1	2.2	2.3	2.4	2.5	2.7	2.9	2.9	3.0	3.0	3.1
Average number of times daily change was 0° to 5°	29.7	29.4	28.1	28.7	28.6	28.1	27.9	27.7	26.3	26.6	26.5	27.8	26.1	25.6	26.1
Average number of times daily change was 6° to 10°	0.7	1.0	1.9	1.6	1.2	2.0	2.3	2.2	3.7	3.5	2.9	3.5	3.8	3.6	3.5
Absolute number of times daily change was 11° to 15° and over during seven years	1	4	11	11	8	7	14	13	14	18	15	16	51	115	23

[1] Five years' record. [2] Three years' record.

APPENDIX No. 32.

Dates of closing and opening of navigation on the lakes and rivers at selected stations of the Signal Service for the winter of 1887–'88.

Stations.	Lakes or rivers.	Navigation.	
		Closing.	Opening.
Dakota:			
Bismarck	Missouri River	Nov. 23	Apr. 9
Fort Buford	do	Nov. 10	May 24
Fort Sully	do	Nov. 26	Apr. 17
Illinois:			
Cairo	Mississippi River	Dec. 29	Jan. 2
Chicago	Lake Michigan	Dec. 13	May 4
Iowa:			
Davenport	Mississippi River	Dec. 21	Mar. 23
Dubuque	do	Nov. 9	Apr. 3
Keokuk	do	Nov. 21	Mar. 7
Kansas:			
Leavenworth	Missouri River	Dec. 20	Feb. 19
Kentucky:			
Louisville	Ohio River	Dec. 29[1]	Jan. 31[1]
Maryland:			
Baltimore	Patapsco River	(2)	(2)
Michigan:			
Alpena	Lake Huron	Dec. 23	Apr. 29
Detroit	Detroit River	Dec. 3	Apr. 29
Escanaba	Little Bay de Noquette	Dec. 15	(3)
Mackinaw City	Mackinaw Straits	Jan. 2	(3)
Marquette	Lake Superior	Dec. 1	May 11
Port Huron	Lake Huron	Dec. 10	Mar. 10
Minnesota:			
Duluth	Lake Superior	Nov. 27	May 22
Moorhead	Red River	Nov. 16	Apr. 23
Saint Paul	Mississippi River	Oct. 26	Apr. 26
Missouri:			
Saint Louis	do	Dec. 21	Feb. 2
Montana:			
Fort Custer	Big Horn River	Nov. 24	Mar. 19
Poplar River	Missouri River	Nov. 22	May 25
Nebraska:			
Omaha	do	Nov. 20	Mar. 16
New York:			
Albany	Hudson River	Dec. 23	Apr. 3
Buffalo	Lake Erie	Dec. 14	Apr. 28
Oswego	Lake Ontario	Dec. 16	Apr. 14
Ohio:			
Cincinnati	Ohio River	(2)	(2)
Cleveland	Lake Erie	Dec. 15	Mar. 28
Sandusky	do	Dec. 20	Apr. 9
Toledo	do	Dec. 15	Mar. 20
Pennsylvania:			
Erie	do	Dec. 23	Apr. 25
Pittsburgh	Ohio River	(3)	(3)
Tennessee:			
Chattanooga	Tennessee River	(2)	(2)
Nashville	Cumberland River	Dec. 29	Jan. 2
Wisconsin:			
La Crosse	Mississippi River	Nov. 28	Apr. 9
Milwaukee	Lake Michigan	(4)	(4)

[1] Navigation resumed for ten days during period.
[2] Navigation not interrupted.
[3] Station closed before opening of navigation.
[4] Navigation impeded but not wholly suspended at any time.

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